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COMMERCIAL FISHERIES REVIEW

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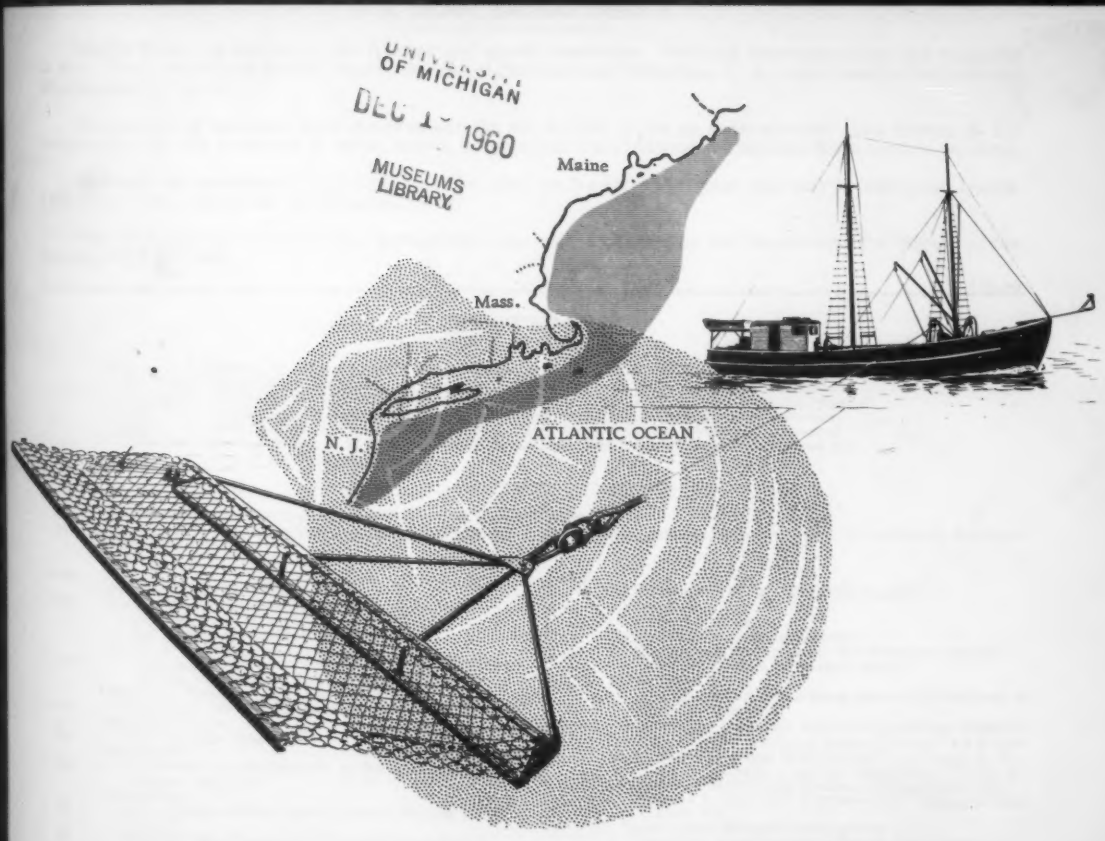

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United States Department of the Interior
Washington, D.C.

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COMMERCIAL FISHERIES REVIEW

A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

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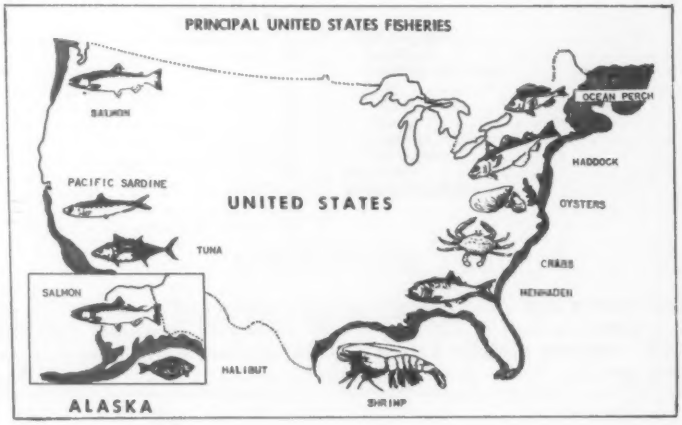

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COMMERCIAL FISHERIES REVIEW

November 1960 Washington 25, D. C. Vol. 22, No.11

A REVIEW OF THE ATLANTIC COAST WHITING FISHERY

By Raymond L. Fritz*

ABSTRACT

The annual landings of whiting or silver hake have increased slowly during the last 25 years, from a few pounds to well over 150 million pounds. Technological advances in processing, freezing, and transportation, as well as changes in fishing gear and grounds, have contributed to this increase. New methods of utilizing this species for animal food and industrial purposes have developed a stable demand and created an important fishery.

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INTRODUCTION

The whiting or silver hake (Merluccius bilinearis) (fig. 1) has always been abundant on the fishing grounds from Maine to Virginia. Prior to 1920, it was at times considered a nuisance by fishermen and landings amounted to less than 7 million pounds. Technological advances in handling fish, particularly quick-freezing and automatic scaling machines, in addi-

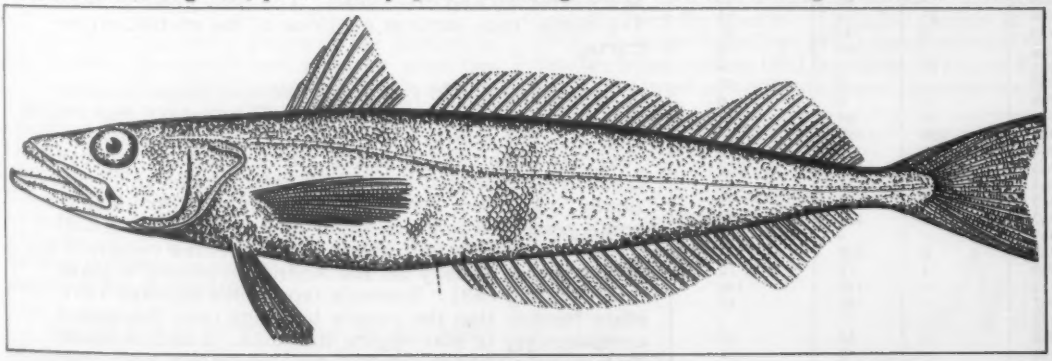

Fig. 1 - Whiting (Merluccius bilinearis).

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tion to the development of markets, stimulated rapid growth of the whiting fishery so that landings rose to 100 million pounds by 1949. Changes in fishing gear, fishing grounds, and utilization added more to the development of this fishery along the Atlantic Coast so that 1957 landings were about 170 million pounds.

Recognizing the need for an understanding of this important fishery, the Atlantic States Marine Fisheries Commission requested the U. S. Fish and Wildlife Service to study the fishery. The program was started in 1954 with funds made available under the Saltonstall-Kennedy Act.

HISTORICAL BACKGROUND: The whiting fishery had its beginning during the early 1840's. Storer (1867) states that some whiting was prepared for the market, but that generally it was not considered very good because it soon became soft and tasteless. Storer also reports that considerable numbers were caught with hook-and-line on Crab Ledge, a few miles from the Boston Lighthouse. He also relates that this species became a general nuisance to the fishermen at Provincetown, Mass., when large quantities were caught in the mackerel nets. Often, 8 to 10 hours were necessary to remove these fish from the nets. However, during September and October the whiting were useful as bait to catch dogfish. Storer (1867) and Nye (1886) reported that large numbers of whiting were stranded on the beach after chasing sand eels or other small fishes.

Very little was published on the whiting from 1900 through the 1920's. Bigelow and Welsh (1925) summarized what little was known of the life history at that time. This account was revised and brought up to date by Bigelow and Schroeder (1953).

GEOGRAPHICAL DISTRIBUTION: The general geographical distribution of the whiting is reported by Bigelow and Schroeder (1953) as the continental shelf of eastern North America, northward to the Newfoundland Banks and southward to the offing of South Carolina. Recently McKenzie and Scott (1956) reported several specimens from the Gulf of St. Lawrence, the northernmost record of this species. Although the range of this fish is extensive, the principal areas of commercial exploitation are along the inshore waters of the Middle and North Atlantic Coast and on Georges Bank.

Table 1 - Annual Landings of Whiting, Chesapeake Bay States, 1931-1957

Year	Maryland	Virginia	Totals Chesapeake Bay
	(1,000 Pounds)		
1957	49	19	68
1956	33	48	81
1955	-	45	45
1954	27	34	61
1953	3	34	37
1952	1	13	14
1951	11	17	28
1950	4	8	12
1949	3	3	6
1948	8	34	42
1947	1,986	112	2,098
1946	680	303	983
1945	567	188	755
1944	145	136	281
1943	-	-	-
1942	6	452	458
1941	-	-	-
1940	6	247	253
1939	1	71	72
1938	-	140	140
1937	-	17	17
1936	-	-	-
1935	-	16	16
1934	-	5	5
1933	-	-	-
1932	-	-	-
1931	-	-	-

REGIONS

The Bureau collects and publishes monthly and yearly summaries[1/] of United States fishery landings by regions. In this paper, data collected for the Chesapeake Bay, Middle Atlantic, and New England regions are examined and discussed. The data given in tables 1-8 come from various sections of the statistical reports.

CHESAPEAKE BAY: The southernmost commercial fishery for whiting is in the Chesapeake Bay region (fig. 2). The appearance of whiting there from year to year has been very erratic. Hildebrand and Schroeder (1928) reported that two pound nets located in Lynnhaven Roads, Va., from 1908 to 1923, caught a few whiting in some years but none in other years. Pearson (1932) listed the whiting with many other species caught in the winter trawl fishery off the North Carolina-Virginia coast during 1931. Records from 1934 through 1957 show further that the yearly landings have fluctuated considerably in that region (table 1). It can be seen that, during 1947, slightly over 2 million pounds were landed, the largest amount ever recorded from that region.

1/Fishery Industries of the United States, 1932-1938, U. S. Department of Commerce, Bureau of Fisheries; and Statistical Digests No. 1-44, Fishery Statistics of the United States, 1939-1957, U. S. Department of the Interior, Fish and Wildlife Service.

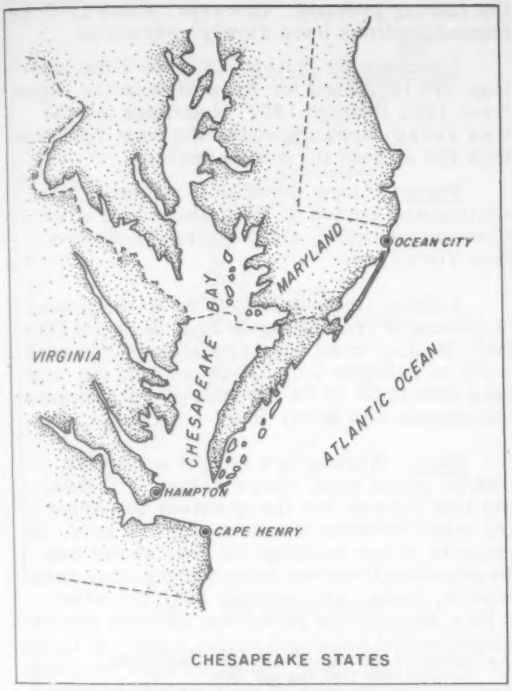

Fig. 2 - Chesapeake Bay States.

Whiting caught in that general region are landed at Ocean City, Md.; Hampton and Norfolk, Va.; and other smaller ports along the coast. Hildebrand and Schroeder (1928) state that the small local catch is easily disposed of in Norfolk markets, where it is known as "winter trout."

During the early years of the fishery in the region, the pound net was the principal gear used. June (1956) reports that during the 1920's there were 14 fishing companies which operated 45 pound nets in the vicinity of Ocean City, Md. Not a single pound net remains in that region today. Along with the decrease in pound nets there was an increase in the number of draggers operating on the grounds. During the past few years, the whiting landings in that region have been primarily from draggers.

MIDDLE ATLANTIC: The Middle Atlantic region includes Delaware, New Jersey, and New York (fig. 3). June and Reintjes (1957) reported that whiting was the predominant species caught by the inshore draggers during 1946 and 1947. In subsequent years, however, they contributed very little to the over-all catch.

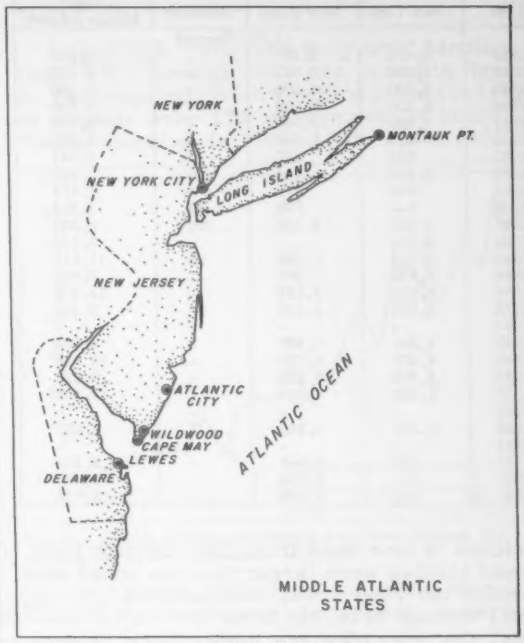

Fig. 3 - Middle Atlantic States.

Annual Landings: Annual landings of whiting in the Middle Atlantic region, 1931 through 1957, are shown in figure 4. It can be seen that the landings increased from 2.5 million pounds in 1931, to approximately 14 million pounds in 1937. From 1937 to 1947, the yearly landings averaged about 10 million pounds, then dropped to 1.5 million pounds in 1948. June and Reintjes (1957) reported that the decline from 1948 to 1951, as shown in figure 4, was associated with a decrease in abundance on

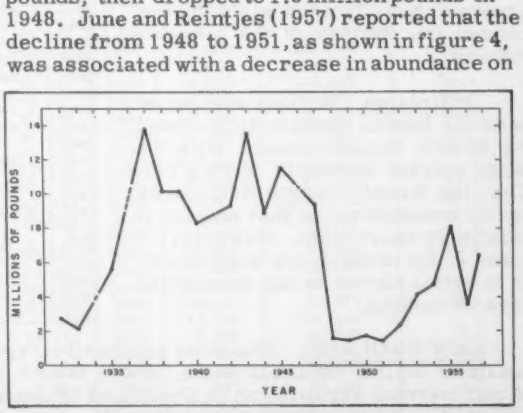

Fig. 4 - Total Middle Atlantic landings of whiting, 1931-1957

Table 2 - Annual Landings of Whiting in Middle Atlantic States, 1931-1957

Year	New York	New Jersey	Delaware	Totals Middle Atlantic
	(1,000 Pounds)			
1957	3,653	2,887	-	6,540
1956	1,540	2,082	-	3,622
1955	3,800	4,300	-	8,100
1954	2,100	2,600	-	4,700
1953	1,400	2,700	-	4,100
1952	823	1,647	-	2,470
1951	684	897	-	1,581
1950	1,363	474	-	1,837
1949	999	579	-	1,578
1948	845	799	13	1,657
1947	1,265	8,156	204	9,625
1946	3,816	-	-	3,816
1945	2,354	9,236	21	11,611
1944	2,935	5,894	-	8,829
1943	5,921	7,583	-	13,504
1942	2,988	6,345	-	9,333
1941	-	-	-	-
1940	2,501	5,887	-	8,388
1939	4,079	6,839	-	10,918
1938	3,956	6,229	-	10,185
1937	5,189	8,624	-	13,813
1936	-	-	-	-
1935	2,284	3,340	5	5,629
1934	-	-	-	-
1933	106	2,041	-	2,147
1932	171	2,534	-	2,705
1931	326	2,408	-	2,734

the fishing grounds. However, since 1952 the annual landings have slowly recovered.

Landings by States: In table 2 the landings are tabulated for the states in the region from 1931 through 1957. Landings for the New Jersey area exceeded the New York landings for almost the entire period.

Ports: Along the Middle Atlantic Coast whiting are landed at such ports as Point Pleasant, Belmar, and Belford, N. J., and at New York City.

Fishing Grounds: Fishing in the region is generally from Long Island, N. Y., to Cape May, N. J. Pound nets are presently located north of Atlantic City, while most of the draggers fish in 20 to 50 fathoms of water between Manasquan and Sandy Hook.

Gear: Whiting are caught with otter trawls, pound nets, purse seines, gill nets, and line trawls, but the greatest quantities are taken by otter trawls and pound nets. An analysis of the landings by gear shows that the pound-net catches exceeded the otter-trawl catches in New York from 1931 through 1934. However, from 1935 through 1957 the otter-trawl catches were larger than the pound nets. In New Jersey, the pound-net catches also exceeded the otter-trawl catches from 1931 through 1946, but from 1947 to 1957 the otter trawlers landed more whiting than the pound nets (table 3). June (1956) in his study of the pound-net fishery along the Middle Atlantic coast reports that the number of nets and the catch of this fishery has decreased considerably. He further states that the competition from the more efficient draggers and the decrease in abundance of many food fish are among the factors which have caused the decline of the pound-net fishery.

Table 3 - Landings of Whiting in the Middle Atlantic Area by Gear from 1931 Through 1957

Year	New York				New Jersey			
	Otter Trawl	Pound Net	All Others	Total	Otter Trawl	Pound Net	All Others	Total
	(1,000 Pounds)							
1957	3,653	-	-	3,653	2,709	290	6	3,005
1956	1,525	9	6	1,540	1,702	447	62	2,212
1955	3,818	35	5	3,858	3,085	1,148	106	4,339
1954	2,111	59	1	2,172	2,106	491	36	2,633
1953	1,425	43	-	1,468	1,359	1,262	132	2,754
1952	776	46	-	822	395	1,229	24	1,648
1951	648	36	-	684	347	550	-	897
1950	1,284	79	-	1,363	137	337	-	474
1949	886	112	-	999	225	354	-	579
1948	756	88	-	844	630	168	-	798
1947	1,134	131	-	1,265	6,365	1,784	7	8,156
1946	3,437	379	-	3,816	-	-	-	-
1945	1,868	486	-	2,354	3,376	5,843	17	9,236
1944	2,533	402	-	2,935	2,622	3,349	12	5,983
1943	5,115	806	-	5,921	2,571	4,947	65	7,583
1942	2,469	505	14	2,988	999	5,343	2	6,344
1941	-	-	-	-	-	-	-	-
1940	1,905	596	-	2,501	523	5,354	9	5,887
1939	3,472	604	2	4,079	354	6,483	2	6,839
1938	3,831	124	-	3,956	304	5,910	15	6,228
1937	4,884	305	-	5,189	376	8,243	4	8,624
1936	-	-	-	-	-	-	-	-
1935	2,020	264	-	2,284	286	3,051	3	3,340
1934	-	-	-	-	-	-	-	-
1933	-	-	-	-	-	-	-	-
1932	-	168	3	171	-	2,534	-	2,534
1931	-	326	-	326	3	2,404	-	2,408

Utilization: Whiting are largely used for human consumption along the Middle Atlantic coast. With the large market available in New York City, the freshly-caught fish can be easily transported to that market in relatively short time. However, some of the whiting are sold directly to retail stores in the immediate area of landing.

NEW ENGLAND: The most productive region for the whiting fishery is located along the coasts of Maine, Massachusetts, Rhode Island, and Connecticut (fig. 5). The earliest report of commercial exploitation is described by Smith (1897). Large quantities of whiting were reported to be abundant every fall in Buzzards Bay, Mass., and captured at night with spears

Fig. 5 - New England States.

for home use and for sale in the New Bedford, Mass., market. Since that early beginning the gear used and the landings in the New England area have changed considerably.

Landings: The New England landings from 1931 through 1957 are shown in figure 6. Landings rose from 8 million pounds in 1931 to slightly over 170 million pounds in 1957. Peaks occurred in 1940, 1945, 1949, 1951,

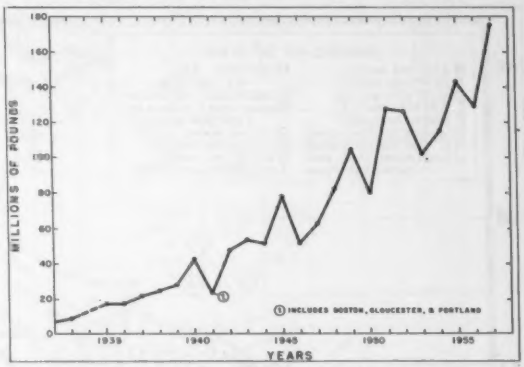

Fig. 6 - Annual landings of whiting from New England, including all types of utilization, 1931-1957.

and 1955, with a slight decrease following each of the peak years. Although fluctuations have occurred through the years, some more severe than others, the trend has been constantly upward.

Landings by States: Landings from 1931 through 1957 for the New England states are shown in table 4. Massachusetts led the other states in total landings with Maine, Rhode Island, and Connecticut following in that order. The expanded processing facilities and the abundance of the whiting along the Massachusetts coast has led to the development of the fishery in that State.

Table 4 - Annual Landings of Whiting in New England, 1931-1957

Year	Maine	Massachusetts	Rhode Island	Connecticut	Totals New England
			(1,000 Pounds)		
1957	15,810	107,777	2,291	237	126,115
1956	14,835	72,322	2,660	150	89,967
1955	25,128	81,884	3,200	361	110,573
1954	9,300	78,000	2,700	224	90,224
1953	12,600	71,800	704	135	85,239
1952	23,326	81,202	1,232	194	105,954
1951	19,576	97,974	742	174	118,466
1950	15,616	48,831	655	362	65,464
1949	12,580	75,776	660	1,020	90,036
1948	8,655	68,904	2,400	509	80,468
1947	6,015	52,591	2,134	911	61,651
1946	5,697	43,171	1,125	1,086	51,079
1945	5,289	68,577	2,907	891	77,664
1944	3,836	43,537	2,723	1,692	51,788
1943	1,962	46,498	4,051	1,487	53,998
1942	2,634	43,266	763	207	46,870
1941	-	-	-	-	-
1940	4,036	35,954	708	172	40,870
1939	4,046	23,493	251	265	28,055
1938	648	24,203	191	52	25,094
1937	-	21,036	1,017	425	22,478
1936	-	-	-	-	-
1935	13	15,418	1,955	30	17,416
1934	-	-	-	-	-
1933	-	8,678	725	17	9,420
1932	2	6,377	792	30	7,201
1931	6	6,930	1,005	129	8,070

Table 5 - Whiting Landings at Gloucester, Mass., Compared with Total Atlantic Landings, 1936-1957

Year	Gloucester	Atlantic Coast	Percent Landed at Gloucester
		(1,000 Pounds)	
1957	77,620	132,846	58.4
1956	48,251	93,787	51.4
1955	59,526	118,872	50.1
1954	49,582	95,240	52.1
1953	41,158	89,622	45.9
1952	47,097	108,441	43.4
1951	51,491	120,075	42.9
1950	22,698	67,299	33.7
1949	30,881	91,618	33.7
1948	22,287	82,149	27.1
1947	14,894	73,479	20.3
1946	14,149	55,880	25.3
1945	27,864	90,009	30.9
1944	15,863	60,986	26.0
1943	22,430	67,502	33.2
1942	26,070	56,671	46.0
1941	12,724	No data	-
1940	8,285	49,609	16.7
1939	6,344	39,044	16.2
1938	2,620	35,419	7.4
1937	544	36,311	1.5
1936	4,375	No data	-

Ports: The principal whiting port for many years, especially since 1942, has been Gloucester, Mass. From 1942 through 1957, Gloucester processed from 21 to 58 percent of the total Atlantic coast whiting landings (table 5). Other ports in the New England region, particularly Rockland and Portland, Maine; Plymouth and Provincetown, Mass.; and Point Judith, R. I., also process whiting.

Fishing Areas: Whiting landed at the New England ports are taken from all of the statistical subareas shown in figure 7. Although some of the subareas are more productive than others, the amount of fishing effort expended in any given subarea is to some extent governed by the distance from home port. It is therefore possible that a productive subarea may be

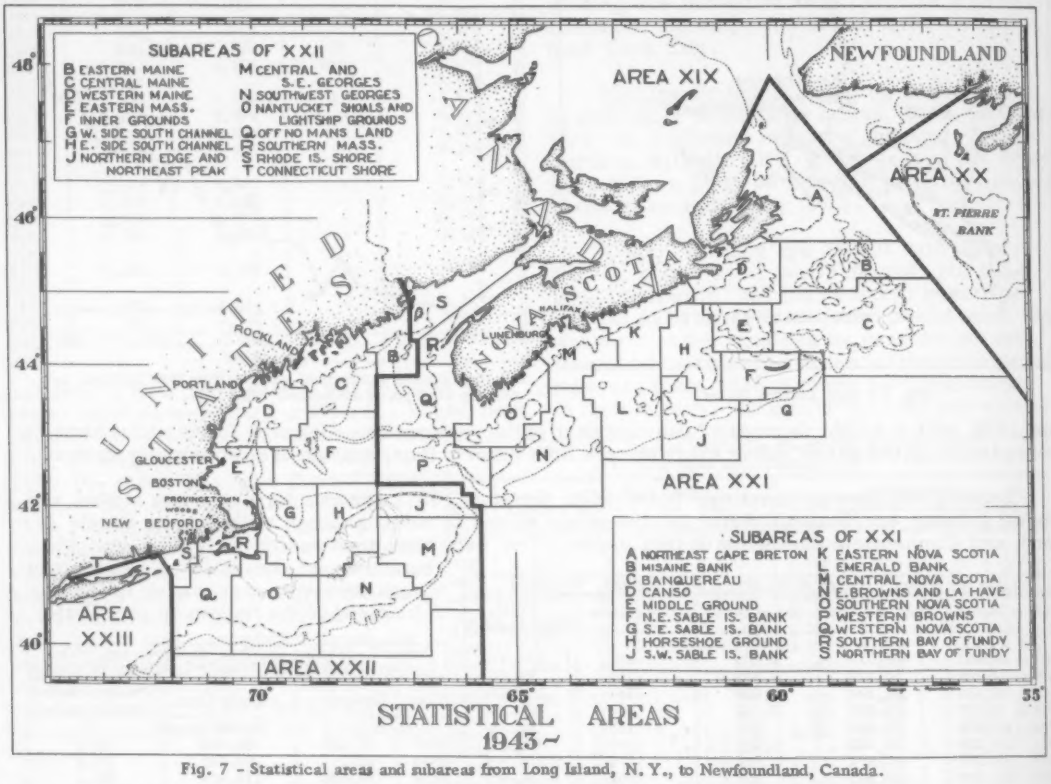

Fig. 7 - Statistical areas and subareas from Long Island, N. Y., to Newfoundland, Canada.

neglected for some time when closer fishing grounds are profitable. Landings from each of the subareas in areas XXI and XXII at certain New England ports for the years 1937 through 1957 are given in tables 6 and 7. Specific fishing grounds referred to will be defined in connection with the subarea under discussion.

AREA XXI: All Subareas: This area is located along the eastern shore of Nova Scotia. Annual landings varied from year to year, with an average catch of 53,000 pounds from 1937 to 1957. At the present time, there are no vessels either from the United States or Canada fishing in this area specifically for whiting. Whiting are caught incidentally by vessels fishing for other species, such as haddock, ocean perch, or cod.

AREA XXII: Subarea B: This subarea contributes very little to the landings. During the 20 years under consideration landings have not exceeded 79,000 pounds. In some years whiting have been caught in the weirs located along the Maine coast.

Table 6 - Whiting Landings by Subareas from Area XXI at Certain New England Ports1/, 1937-1957

Year	Unit	Subareas														Totals
		A	B	C	E	F	H	J	K	N	O	P	Q	R	L	
1957	Lbs.	-	-	-	-	-	800	-	950	-	-	400	-	1,783	-	3,933
	%	-	-	-	-	-	20.3	-	24.1	-	-	10.1	-	45.3	-	100.0
1956	Lbs.	-	-	145	-	-	6,100	-	508	-	-	-	-	2,000	-	8,753
	%	-	-	1.6	-	-	69.6	-	5.8	-	-	-	-	22.8	-	100.0
1955	Lbs.	-	-	-	-	-	-	-	-	-	3,000	4,000	-	-	-	7,000
	%	-	-	-	-	-	-	-	-	-	42.8	57.1	-	-	-	100.0
1954	Lbs.	52,438	103,540	103,540	-	-	567	-	-	-	-	700	-	-	-	260,785
	%	20.1	39.7	39.7	-	-	.217	-	-	-	-	.268	-	-	-	100.0
1953	Lbs.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1952	Lbs.	-	-	289,745	-	-	334	501	-	5,427	918	4,926	-	-	-	301,851
	%	-	-	95.9	-	-	.110	.165	-	1.7	.304	1.6	-	-	-	100.0
1951	Lbs.	-	-	155,310	-	-	-	-	-	-	2,054	1,169	3,927	-	-	162,460
	%	-		95.5	-	-	-	-	-	-	1.2	.719	2.4	-	-	100.0
1950	Lbs.	38,144	-	-	-	1,169	-	-	11,070	-	450	-	-	-	-	50,833
	%	75.0	-	-	-	2.2	-	-	21.7	-	.88	-	-	-	-	100.0
1949	Lbs.	-	-	-	-	-	-	-	2,921	2,672	120	-	609	-	-	6,322
	%	-	-	-	-	-	-	-	46.2	42.2	1.8	-	9.6	-	-	100.0
1948	Lbs.	-	-	307	-	-	-	-	511	-	4,509	-	-	-	-	5,327
	%	-	-	5.7	-	-	-	-	9.5	-	84.6	-	-	-	-	100.0
1947	Lbs.	-	-	-	-	-	-	-	-	-	317	1,125	-	-	-	4,156
	%	-	-	-	-	-	-	-	-	-	21.9	78.0	-	-	-	100.0
1946	Lbs.	-	-	-	4,156	-	-	-	-	-	-	-	-	-	-	1,442
	%	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	100.0
1945	Lbs.	-	-	-	-	-	-	-	-	-	73,510	6,737	1,268	-	-	81,515
	%	-	-	-	-	-	-	-	-	-	90.1	8.2	1.5	-	-	100.0
1944	Lbs.	-	-	-	-	-	-	175	-	-	813	-	380	-	-	1,368
	%	-	-	-	-	-	-	12.7	-	-	59.4	-	27.7	-	-	100.0
1943	Lbs.	-	-	-	-	-	-	-	-	-	468	1,260	-	-	-	1,728
	%	-	-	-	-	-	-	-	-	-	27.1	72.9	-	-	-	100.0
1942	Lbs.	-	-	-	-	-	-	-	-	250	-	-	-	-	-	250
	%	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0
1941	Lbs.	-	-	-	-	-	-	-	-	-	1,530	-	-	-	-	1,530
	%	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	100.0
1940	Lbs.	-	-	-	-	-	-	-	-	-	3,192	420	-	-	-	3,612
	%	-	-	-	-	-	-	-	-	-	88.3	11.6	-	-	-	100.0
1939	Lbs.	-	-	1,600	-	-	-	2,010	-	-	3,940	4,000	-	-	100	11,650
	%	-	-	13.7	-	-	-	17.2	-	-	33.8	34.3	-	-	.85	100.0
1938	Lbs.	-	-	-	-	-	-	-	-	-	66,368	65,052	-	-	-	131,420
	%	-	-	-	-	-	-	-	-	-	50.5	49.4	-	-	-	100.0
1937	Lbs.	-	-	-	2,200	-	1,500	-	-	280	-	2,490	-	-	-	6,470
	%	-	-	-	34.0	-	23.1	-	-	4.3	-	38.4	-	-	-	100.0

1/Portland, Maine; Gloucester, Boston, Cape Cod ports, New Bedford, Mass.; Point Judith, R. I.; and Stonington, Conn.

Table 7 - Whiting Landings by Subareas from Area XXII at Certain New England Ports1/, 1937-1957

Year	Unit	Subareas														Cape Cod Ports2/	New England Uncl.	Totals
		B	C	D	E	F	G	H	J	M	N	O	Q	R	S			
1957	1,000 lbs.	-	1	18,062	50,173	291	20,354	34,811	21	1	1	4	7	27	2,291	-	-	126,044
	%	-	-	14.3	39.8	.2	16.1	27.6	-	-	-	-	-	-	1.8	-	-	100.0
1956	1,000 lbs.	-	1	15,397	26,313	33	17,423	27,789	-	-	-	45	133	7	2,810	-	-	89,951
	%	-	-	17.1	29.3	-	19.4	30.9	-	-	-	.1	.1	-	3.1	-	-	100.0
1955	1,000 lbs.	-	-	28,248	32,661	211	14,333	27,359	280	1	-	-	237	66	3,618	-	-	107,014
	%	-	-	26.4	30.5	.2	13.4	25.6	.3	-	-	-	.2	.1	3.4	-	-	100.0
1954	1,000 lbs.	1	-	10,711	53,544	61	17,817	111	2	-	-	88	-	-	3,017	-	-	85,352
	%	-	-	12.5	62.7	.1	20.9	.1	-	-	-	.1	-	-	3.5	-	-	100.0
1953	1,000 lbs.	2	5	13,215	63,140	111	6,836	21	9	-	-	14	-	-	838	-	1,344	85,535
	%	-	-	15.4	73.8	.1	8.0	-	-	-	-	-	-	-	1.0	-	1.6	100.0
1952	1,000 lbs.	-	105	29,995	51,327	236	2,551	94	5	1	1	2	9	-	1,427	14,387	34	100,174
	%	-	.1	29.9	51.2	.2	2.5	.1	-	-	-	-	-	-	1.4	14.4	-	100.0
1951	1,000 lbs.	8	267	23,440	54,429	312	8,972	165	7	-	-	2	-	-	917	18,554	44	107,117
	%	-	.2	21.9	50.8	.3	8.4	.1	-	-	-	-	-	-	.8	17.3	-	100.0
1950	1,000 lbs.	-	1	16,210	28,498	64	1,688	1	-	-	-	-	20	-	1,017	15,170	32	62,701
	%	-	-	25.9	45.4	.1	2.7	-	-	-	-	-	-	-	1.6	24.2	-	100.0
1949	1,000 lbs.	3	2	13,373	49,017	120	2,560	46	10	4	-	1	8	-	1,679	16,275	24	83,122
	%	-	-	16.1	59.0	.1	3.1	.1	-	-	-	-	-	-	2.0	19.6	-	100.0
1948	1,000 lbs.	-	2	9,400	38,115	157	2,290	21	-	-	-	-	1	-	2,908	18,876	59	72,829
	%	-	-	12.9	52.3	.2	3.1	-	-	-	-	-	-	-	4.0	27.3	.1	100.0
1947	1,000 lbs.	1	6	6,334	29,408	61	2,204	3	1	-	-	12	2	1	3,046	16,824	313	58,216
	%	-	-	10.9	50.5	.1	3.8	-	-	-	-	-	-	-	5.2	28.9	.5	100.0
1946	1,000 lbs.	22	-	2,185	23,735	18	1,239	6	-	-	-	2	6	-	2,213	16,035	35	45,496
	%	.1	-	4.8	52.2	-	2.7	-	-	-	-	-	-	-	4.9	35.2	.1	100.0
1945	1,000 lbs.	9	142	3,591	36,333	11	2,416	26	5	7	-	21	49	19	3,800	-	4,681	51,110
	%	-	.3	7.0	71.1	-	4.7	.1	-	-	-	.1	.1	.1	7.4	-	9.2	100.0
1944	1,000 lbs.	3	96	1,661	15,519	65	3,530	21	-	-	-	35	92	21	4,417	-	4,076	29,539
	%	-	.3	5.6	51.3	.2	11.9	.1	-	-	-	.1	.3	.1	14.9	-	13.8	100.0
1943	1,000 lbs.	3	25	1,232	19,216	155	764	271	19	6	1	20	60	1	5,542	-	125	27,440
	%	-	.1	4.5	70.0	.6	2.8	.9	.1	-	-	.1	.2	-	20.2	-	.5	100.0
1942	1,000 lbs.	4	83	1,180	25,680	138	664	25	12	1	-	19	8	-	971	-	300	29,095
	%	.1	.3	4.0	88.3	.5	2.3	.1	.1	-	-	.1	-	-	3.3	-	1.0	100.0
1941	1,000 lbs.	-	108	2,446	16,875	236	2,623	60	1	4	-	5	-	-	-	-	-	22,358
	%	-	.5	10.9	75.5	1.0	11.7	.3	-	.1	-	.1	-	-	-	-	-	100.0
1940	1,000 lbs.	-	239	3,207	10,777	51	2,421	36	-	-	-	-	-	-	879	-	-	17,610
	%	-	2.0	27.6	61.2	.4	20.8	.3	-	-	-	-	-	-	7.6	-	-	100.0
1939	1,000 lbs.	38	238	2,859	6,607	23	961	21	-	18	-	6	-	-	285	-	-	11,036
	%	.3	2.2	25.9	59.9	.2	8.7	.2	-	.2	-	.1	-	-	2.4	-	-	100.0
1938	1,000 lbs.	79	307	1,363	7,883	9	1,168	64	11	3	-	-	-	-	244	-	1	11,132
	%	.7	2.8	12.2	70.8	.1	10.5	.6	.1	-	-	-	-	-	2.2	-	-	100.0
1937	1,000 lbs.	-	3	322	5,653	95	350	43	42	5	-	1	17	-	1,441	-	1	7,973
	%	-	-	4.0	70.9	1.2	4.4	.5	.5	-	-	-	.2	-	18.1	-	-	100.0

1/Portland, Maine; Gloucester, Boston, Cape Cod ports, New Bedford, Mass.; Point Judith, R. I.; and Stonington, Conn.
2/The catch landed at Cape Cod ports cannot be allocated to the various subareas.

Subarea C: During the early years, 1938 to 1940, this subarea contributed slightly over 200,000 pounds to the total landings. However, from 1941 through 1957, landings fluctuated considerably reaching a peak of 267,000 pounds in 1951, and decreasing to 1,000 pounds in 1957.

Subarea D: The Isles of Shoals, Casco Bay, and Jeffreys Ledge are the principal fishing grounds in this subarea. Landings during the years 1938 to 1941, ranged from 1.3 million pounds to 3.2 million pounds. During the next 6 years the catch declined, but from 1948 through 1957, the catch increased, reaching an all-time high of 30 million pounds in 1952. These grounds largely support the whiting fleet from the principal Maine ports.

Subarea E: This subarea includes the most productive whiting fishing grounds along the New England coast, such as Ipswich Bay, Stellwagen Bank, and Cape Cod Bay. Vessels from Gloucester, Plymouth, Provincetown, and other Cape Cod ports, fish these grounds regularly. Annual landings from 1937 through 1957 rose from 5.5 million pounds to 54.4 million pounds and accounted for over 50 percent of the total New England landings from 1937 to 1954.

Subarea F: Cashes Ledge, Fippenies Ledge, and the deep water of the Gulf of Maine are the main fishing grounds in this subarea. From 1938 to 1957, annual landings amounted to less than 325,000 pounds. The landings indicate that the catch of whiting is incidental to the capture of other species, such as ocean perch or haddock.

Subarea G: From 1938 through 1957, this subarea contributed from 1 to 20 million pounds to the total landings. The major fishing grounds in this subarea are located along the outside of Cape Cod from Provincetown to Chatham.

Subarea H: This subarea is the major offshore fishing ground for whiting. Prior to 1955, a few vessels from the nearby ports fished this ground with little success. During 1955, large concentrations were found near the Cultivator Shoal and vessels, largely from Gloucester, began to fish this subarea intensively. Since then over 25 million pounds have been landed each year from this subarea.

Subarea S: Draggers from Rhode Island and Connecticut generally fish in this subarea. Landings have fluctuated from 240,000 pounds in 1938 to 5.5 million pounds in 1943. This was followed by a decrease to 850,000 pounds in 1953, and during the next 3 years the landings increased to 3 million pounds. A slight decrease of approximately 1 million pounds was recorded for the landings for 1957. This subarea is an important fishing ground for the growing industrial fishery located at Point Judith, R. I. These figures represent the landings for human consumption and do not include the landings for industrial use and animal food.

Subareas J, M, N, O, Q and R: The total landed averaged less than 23,000 pounds for all subareas combined. This small amount can be considered as incidental to the catch of other fishes.

Gear: Whiting are taken in pound nets, fyke nets, and floating traps, but the greatest quantities are taken by otter trawlers. A typical New England dragger (less than 50 gross tons) is shown in figure 8. These vessels usually fish the inshore waters along the coast, while the medium draggers (51 to 150 gross tons) fish both the inshore and offshore grounds. The trawls are of a conventional design with a small mesh netting, usually $2\frac{1}{2}$ inches stretched measure, or with a fine mesh liner in the cod end.

Landings by Gear: Total landings for the various types of gear from 1931 through 1957 are shown in table 8. It can be seen that the landings at the Maine ports have been largely from otter trawls, with a small amount from the other types of gear. Floating traps and pound nets accounted for more fish from 1931 through 1937 at the Massachusetts ports, but from 1938 on the landings from the otter trawl exceeded all other types of gear. A similar situation existed in the Rhode Island landings with the stationary gear catching larger quantities of whiting from 1931 through 1942, and the otter trawl exceeding all other types of gear after 1942. Landings at Connecticut ports are primarily from small draggers.

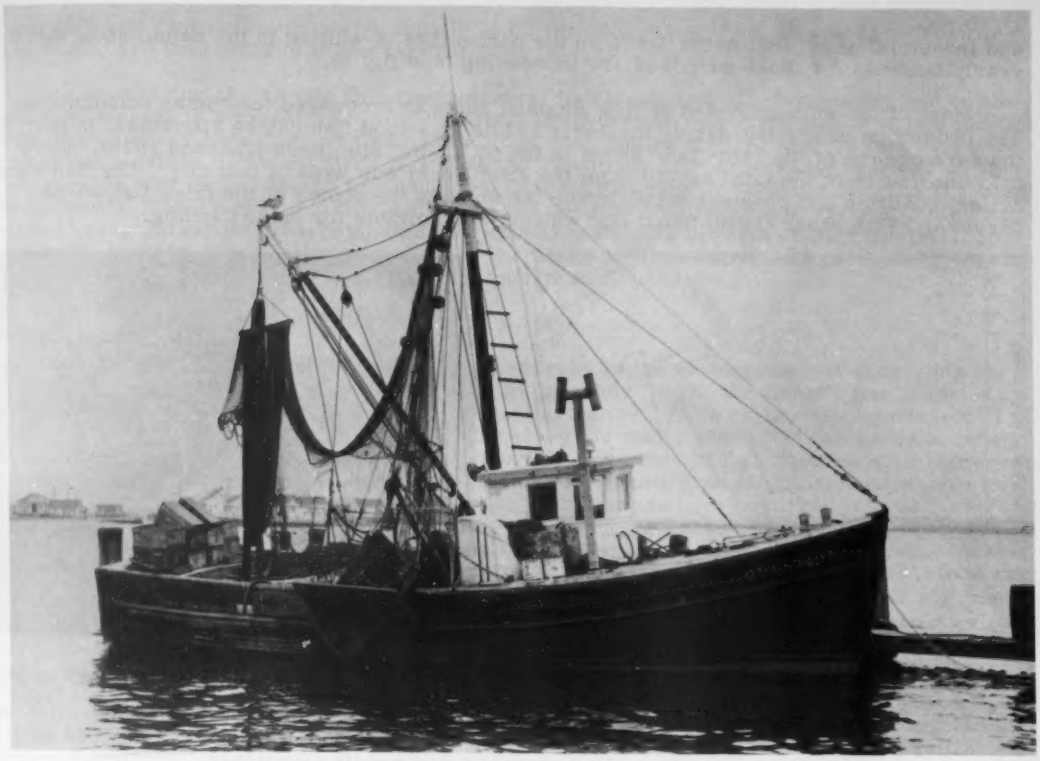

Fig. 8 - Small New England dragger.

Table 8 - Whiting Landings by State and Gear, 1931-1957

Year	Maine					Massachusetts					Rhode Island					Connecticut				
	Otter Trawl	Float. Trap	Pound Net	Other	Total	Otter Trawl	Float. Trap	Pound Net	Other	Total	Otter Trawl	Float. Trap	Pound Net	Other	Total	Otter Trawl	Float. Trap	Pound Net	Other	Total
										(1,000 Pounds)										
1957	15,809	-	-	-	15,809	107,573	362	90	19	107,934	1,969	322	-	-	2,291	237	-	-	-	237
1956	14,835	-	-	-	14,835	71,291	837	167	34	72,319	1,771	889	-	-	2,660	150	-	-	-	150
1955	25,071	-	-	57	25,128	81,068	248	465	103	81,884	2,691	366	-	-	3,057	381	-	-	-	381
1954	9,318	-	-	-	9,318	77,266	160	511	112	78,049	2,589	204	-	-	2,793	234	-	-	-	234
1953	12,658	-	-	9	12,667	69,913	212	1,534	199	71,858	567	136	-	-	703	134	-	1	-	135
1952	23,321	-	-	7	23,328	79,401	80	1,503	218	81,202	1,141	93	-	-	1,233	193	-	1	-	194
1951	19,575	-	-	1	19,576	97,015	89	745	125	97,974	644	98	-	-	742	174	-	-	-	174
1950	15,579	35	-	1	15,615	48,061	323	2,490	44	48,918	616	39	-	-	655	362	-	-	-	362
1949	12,556	-	-	25	12,581	75,163	133	356	134	75,775	585	84	-	-	669	1,019	-	-	-	1,019
1948	8,645	9	-	-	8,654	65,830	318	2,620	126	68,903	2,098	301	-	-	2,399	503	-	6	-	509
1947	5,996	-	-	19	6,015	50,663	478	1,681	98	52,900	3,033	101	-	-	3,134	904	-	7	-	911
1946	5,679	5	-	13	5,697	41,446	1,394	149	162	43,171	802	323	-	-	1,125	1,080	-	8	-	1,088
1945	5,282	-	-	6	5,288	63,607	1,744	3,068	136	68,577	2,421	457	-	-	2,908	885	-	6	-	891
1944	3,835	-	-	1	3,836	41,999	781	682	74	43,536	2,379	344	-	-	2,723	1,670	-	13	-	1,683
1943	1,948	11	-	3	1,962	44,785	423	1,004	286	46,498	3,171	880	-	-	4,051	1,465	-	22	-	1,487
1942	2,634	-	-	-	2,634	34,073	1,124	7,988	111	43,296	185	608	3	-	784	193	-	14	-	207
1941	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1940	4,034	2	-	-	4,036	24,337	1,378	9,688	650	36,053	75	619	14	-	708	169	-	2	-	171
1939	4,031	1	-	24	4,046	15,840	1,117	6,778	58	23,493	19	317	14	-	350	363	-	2	-	365
1938	625	-	-	23	648	12,202	1,856	10,091	54	24,203	63	118	10	-	191	53	-	-	-	53
1937	-	-	-	-	-	7,371	3,422	10,313	33	21,039	311	682	24	-	1,017	435	-	-	-	435
1936	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1935	-	12	-	-	12	2,499	2,435	10,322	22	15,418	442	1,176	336	-	1,954	-	-	-	-	-
1934	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	30	-	-	-	30
1933	-	-	-	-	-	343	1,253	6,413	669	8,678	233	330	163	-	725	17	-	-	-	17
1932	-	-	2	-	2	132	1,079	4,578	588	6,377	205	536	51	-	792	29	-	-	-	29
1931	-	6	-	-	6	102	1,434	4,613	781	6,930	61	895	49	-	1,005	-	139	-	-	139

Utilization: Probably few other species are utilized in so many ways as the whiting of New England. This species is processed at ports for human consumption, animal food, and industrial use. Although accurate figures are not available for landings destined for animal

and industrial uses, estimates based on the percentage of whiting in the catch, show that the yearly landings for those purposes are increasing (see fig. 9).

Most of the whiting landed at New England ports is processed for human consumption. The promotion of whiting during the early 1920's as a food fish can be attributed, in part, to the development of the "hot-fish" shops in the St. Louis, Mo., area (Johnson 1932). More than one-fourth of the total supply from the East Coast was used in that city. The fish's excellent qualities and constant supply made the species the choice of the fried fish shops. Jarvis and Puncochar (1940) found that whiting was suitable for home canning.

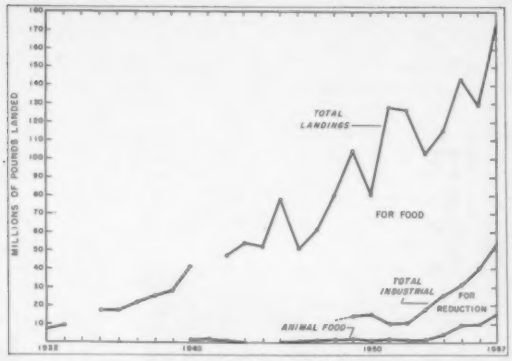

Fig. 9 - Annual New England landings of whiting, 1932-1957.

Fig. 10 - Loading whiting for mink food in 50-pound cartons.

The development of efficient freezing units and rapid transportation further increased the demand for whiting, from the New England region, and now processing for human consumption has developed into an industry utilizing modern machines and assembly-line methods. The whiting are unloaded onto conveyors that feed to automatic scaling, washing, and heading machines. Trimming and loading of cartons or packages are done by hand. The cartons or packages are then machine-wrapped, frozen, and placed in cold storage for subsequent distribution.

Whiting are also prepared as mink food in several New England ports, among them New Bedford, Sandwich, and Provincetown, Mass. The fish are well-iced at sea in the round with the same care as if for human consumption. After the fish are unloaded, they are washed

Fig. 11 - Whiting frozen for mink food.

Fig. 12 - Fish being delivered to the dehydration plant for processing.

thoroughly and frozen immediately, usually in 50-pound cartons (figs. 10 and 11). The cartons of fish are then shipped to the various mink farms throughout the country.

The processing of fish into fish concentrates, fish meal, and oils for poultry and cattle feed supplements is a rapidly-growing industry. Dehydration or reduction plants are located in or nearby every New England fishing port (fig. 12). Sayles (1951) reported that 10.8 percent of the landings in the southern New England industrial fishery was composed of whiting. This species was ranked fourth in abundance. Recent analysis by Edwards and Lux (1958) of the industrial fishery revealed that whiting is the second most important species, following the red hake. Edwards (1958) computed that approximately 22 percent of the industrial landings at Gloucester, Mass., was composed of the whiting. This significant percentage demonstrates the importance of the species to the industrial fishery.

SUMMARY

The whiting fishery along the Atlantic coast from Maine to Virginia has undergone a number of changes during the past 25 years. In the early years, the fishery was principally an inshore operation with pound and trap nets. During the 1940's an increasing number of draggers began to fish exclusively for whiting along the entire coast. These vessels, being more efficient and versatile, began to land many more pounds of fish than the stationary gear. Changes in gear enabled the exploitation of many new fishing grounds in inshore waters as well as offshore. Along with changes in fishing methods, changes occurred in processing and distribution. The technological developments and improvements of handling and processing fish aided the New England fisheries to produce a better product and also expand the market to many parts of the country. New uses for the whiting in the industrial and animal food market has increased the value of the species. It is evident that the species does and will continue to play an important role in the economy of the New England fishing ports.

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RAPID OBJECTIVE FRESHNESS TEST FOR BLUE-CRAB MEAT AND OBSERVATIONS ON SPOILAGE CHARACTERISTICS

By Caroline H. Kurtzman* and Donald G. Snyder*

ABSTRACT

The Picric Acid Turbidity test, reported earlier for use with shrimp, has been found to be satisfactory, with one modification, for use as a rapid, objective freshness test for various commercial styles of blue-crab meat held under different conditions of storage and picked from steamed or boiled crabs. This test permits identification of blue-crab meat of fair or better quality and identification of crab meat of borderline or poorer quality. Data obtained in these studies gave an indication of the spoilage characteristics of the crab.

INTRODUCTION

No satisfactory objective test has been described to evaluate the freshness of processed meat of blue crab (Callinectes sapidus). Benarde (1958) reported that although it has generally been accepted that measurements of changes in pH and in bacterial populations could probably be used as indices of quality of blue-crab meat, he found that the changes in pH during spoilage were erratic and that the measurements of total bacterial populations were variable and unrelated to organoleptic indications of spoilage. Thus, neither pH nor bacterial counts can be considered suitable for evaluating the freshness of the product.

Fig. 1 - Picking crabs in a plant on the eastern shore of Maryland.

It would be desirable, however, if a quick and easily-conducted objective freshness test for blue-crab meat were available, since the meat is a perishable, premium product. This test would permit more efficient marketing in that the consumer need not accept claims of freshness on mere faith, and the producer selling a high-quality, fresh crab meat could furnish objective proof of that fact and benefit accordingly. A freshness test, termed the Picric Acid Turbidity test (PAT test), has been developed and shown to be satisfactory for use with iced shrimp (Kurtzman and Snyder 1960). It was felt that this test, or a modification of it, might also prove useful with blue crab, for both crab and shrimp are crustacea, and the meat of each may spoil similarly.

In commercial production, blue crabs are processed by either steaming or boiling, and three styles of meat are produced: lump, regular, and claw. In practice these products generally are held in ice-storage. However, deviations from this do occur, and may result in varying spoilage characteristics. Very little, however, has been reported on this subject.

The purposes of the present study therefore were:

1. To determine the suitability of a modified PAT test for use in assessing the quality of processed meat of blue crab by comparing both the PAT test and a sensory test in the evalu-

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ation of the freshness of lump, regular, and claw meat processed by steaming or boiling and held under various conditions of storage.

2. To observe the spoilage characteristics of the various styles processed by steaming or boiling and held under various conditions of storage.

EXPERIMENTAL

Samples: Four lots of crab meat (A, B, C, and D) were obtained from a processing plant at Cambridge, Md. These lots were processed similarly. The crabs of each lot were divided into two groups according to the method used in cooking them: (1) steamed and (2) boiled.

1. Steamed: The crabs were steamed for 10 minutes at 15 pounds pressure on the same day that they were caught and were allowed to cool overnight at room temperature. They were picked early the next morning by four pickers, who continued work on the lot until they had obtained four 1-pound cans of lump meat, four 1-pound cans of regular meat, and four 1-pound cans of claw meat. The cans were sealed when filled and were held on the picking table until all could be placed in crushed ice at the same time. The iced cans were brought to the laboratory. Here, the meats from each group of four cans were mixed thoroughly in a sterilized container to obtain homogenity and were then repacked into the same four 1-pound cans.

Table 1 - Data on the Six Samples of Each Lot of Crab Meat

Sample Designation	Process	Style	No. of 1-Lb. Cans
SL	Steamed	Lump	4
SR	Steamed	Regular	4
SC	Steamed	Claw	4
BL	Boiled	Lump	4
BR	Boiled	Regular	4
BC	Boiled	Claw	4

2. Boiled: The crabs were boiled for 15 minutes in tap water. In every other respect they were treated in the same manner as were the steamed crabs.

Data on the six samples of each lot thus obtained are summarized in table 1.

The four lots (A, B, C, and D) were treated differently only in respect to holding conditions maintained during testing. Lot A cans were packed in ice and held at 34° F. in a refrigerator; lot B cans were packed in ice and held at room temperature; lot C cans were held in an incubator at 40° F. without ice; and lot D cans were also held in an incubator at 40° F. without ice. (This easily-controlled condition of storage used with lot C was duplicated in lot D to obtain an indication of possible prestorage variation in quality of the commercial packs of crab meat.)

Table 2 - Data on Storage Treatment of the Four Lots of Crab Meat

Lot	Storage Treatment
A	Packed in ice and held at 34° F. in a refrigerator.
B	Packed in ice and held at room temperature.
C	Held without ice in an incubator at 40° F.
D	Held without ice in an incubator at 40° F.

Data on the storage conditions used with the four lots are summarized in table 2.

Picric Acid Turbidity Test: Two 25-gram aliquots were removed daily from each of the 24 samples (4 lots; 6 samples per lot). Each aliquot was macerated about 20 seconds in a mechanical blendor with 100 milliliters of 70-percent ethanol. Then 25 milliliters of saturated aqueous picric acid solution was added and the mixture was reblended for about 10 seconds. The resultant slurry was filtered through Whatman No. 41 filter paper. Approximately 10 milliliters of filtrate was collected to which was added one milliliter of 5 N hydrochloric acid. The turbidity of this solution was measured using a Klett-Summerson photoelectric colorimeter with a green filter (540 millimicrons)1/.

Sensory Test: A panel composed of five members rated the crab meat on the basis of flavor and odor. Since texture and appearance may be affected by factors other than spoil-

1/ This procedure is the same as that used with the shrimp except that hydrochloric acid was not added to the filtrate from the shrimp meat. Without the addition of the acid, little turbidity was obtained when the crab meat of the regular pack was tested. It may be that liver tissue (commonly mistermed "fat") that is distributed throughout the regular pack, may be interfering with the formation of the turbid material. However, this modification permitted good results to be obtained when testing the meat of the regular pack, and did not adversely affect the results obtained when testing meat of the lump or claw packs.

Table 3 - System of Rating Used in the Sensory Test

Rating		Definition of Rating as Applied to Blue-Crab Meat
Numerical	Discriptive	
5	High	Delicate flavor; sweet
4	Good	Loss of sweetness; no detection of any off-flavor of odors
3	Fair	Detection of slight off-flavors or odors
2	Borderline	Noticeable off-flavors or odors, but still edible
1	Inedible	Strong or offensive off-flavors or odors

age, these attributes were not considered in the judging. The rating system used by the panel is given in table 3. Arbitrarily, it was decided that an average daily value of 5.0 (requiring a perfect panel score) indicates crab meat of high quality; 4.0 to 4.9, good quality; 3.0 to 3.9, fair quality; 2.0 to 2.9, borderline quality; and 1.0 to 1.9, inedible quality.

RESULTS AND DISCUSSIONS

Visually, the filtrates obtained appeared clear when instrument readings were 30 or less and appeared increasingly turbid as the readings became higher. The time required to conduct an analysis was less than 5 minutes.

Colorimeter readings (turbidity values) and sensory evaluations for each lot of the crab meat processed by steaming are presented in figure 1; similar data for the crab meat processed by boiling are presented in figure 2. Actual values from duplicate samples agreed very closely on any given day. This tendency was not observed in the earlier study on iced shrimp except when the shrimp were quite fresh.

When the samples of crab were of fair quality or better, turbidity values obtained when testing lump meat were less than 35 (very slightly turbid), when testing regular meat were less than 40 (also very slightly turbid), and when testing claw meat were less than 25 (clear). Thus, values of 35, 40, and 25 (or less in each case) for lump, regular, and claw meat, respectively, indicate crab of fair or better quality. Turbidity values above 35 for lump, 45 for regular, and 25 for claw meat indicate crab of borderline or lower quality. There was only one exception: turbidity values above 40 were not obtained until 1 day after a sensory indication of borderline quality with the sample SR of lot D.

It is interesting that in the earlier studies with iced shrimp, turbidity values increased above 30 during the time that the organoleptic tests were still indicating the shrimp to be of fair quality.

Comparing figures 1a with 2a, 1b with 2b, and 1c with 2c indicates there was no consistent differences in the pattern of spoilage attributable to the type of processing utilized. The meat seemed to hold equally well whether the crabs were steamed or boiled.

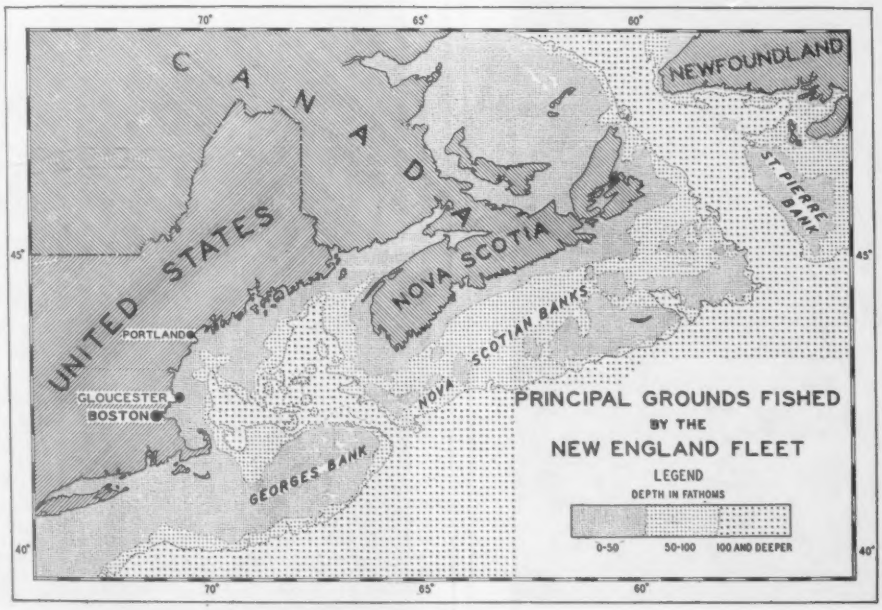
Comparing data obtained on all variables of lots C and D indicates that lot C was of higher initial quality than was lot D. These two lots were held at the same temperature (40° F.), yet the meat of lot C spoiled sooner than did that of lot D. This observation suggests that initial quality of fresh crab meat as determined by sensory evaluation is not necessarily an indication of its keeping quality. It may be that the meat preferred by the panel was more heavily contaminated during picking and thus spoiled more rapidly, or it may even be that the original preference for any one fresh meat over another might actually have been due to desirable flavors imparted as a result of particular bacterial flora.

In the present study, flavor and odor changes during spoilage were quite different for lump, regular, and claw meat. The different sensations experienced by the panel made it seem to them that entirely unrelated products were being tested. Their reactions are understandable, however, since the muscle tissues of the claw actually are different both in appearance and in texture from the muscle tissues of the body of the crab, from which both regular and lump meat are picked. Benarde (1958) reported that the yearly mean pH of fresh lump meat is 7.65, of regular meat is 7.8, and of claw meat is 8.3; thus, it would seem likely that a different bacterial flora would grow optimumly in each of the meats and that the meats would therefore spoil differently. Also, the presence of liver tissue mixed in the regular meat may be another reason for a different sensation obtained when the regular meat is tasted, since there is very little liver, if any, present in lump meat, and none present in claw meat. In general, the claw meat maintained good quality longer than did either lump meat or regular meat, both of which spoiled at similar rates.

CONCLUSIONS

Results obtained from this study indicate that the Picric Acid Turbidity test reported earlier for use with shrimp is satisfactory, with one modification, as a rapid, objective freshness test to identify blue-crab meat of fair or better quality and blue-crab meat of borderline or poorer quality. A colorimeter probably would be necessary for the practical application of this test, at least with lump meat and regular meat.

Observations of the spoilage characteristics indicate that there is no consistent difference whether steaming or boiling is used in processing and that the initial quality of fresh blue crab as determined by sensory evaluation is not necessarily an indication of its keeping quality. Also, it was observed that flavor and odor changes during spoilage are quite different for lump, regular, and claw meat and that the claw meat maintained good quality longer during storage than did either lump or regular meat, which spoiled at similar rates.



TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 5--
SINK GILL-NET FISHING
IN NEW ENGLAND:

What was at one time a thriving gill-net fishery, based principally at Gloucester, Mass., now only shadows its former importance. The Gloucester gill-net fishing fleet has been reduced from over 50 vessels earlier in the century to only 3 at present (1960). Fishing is done during the spring and fall months. The period extending from mid-June through mid-September is not utilized by the gill netters--partly because of the large numbers of dogfish that are present at that time. Cod (Gadus morhua), pollock (Pollachius virens), and haddock (Melanogrammus aeglefinus) are included among the species most commonly caught.

The following pictorial presentation of the sink gill-net fishery is a brief attempt to document the fishery as it exists today.

Fig. 1 - The Phyllis A., a 55-foot Gloucester vessel engaged in the sink gill-net fishery. The vessels in this fishery vary in length from 55 to approximately 75 feet. Practically all of the fishing takes place within a 30-mile radius of Gloucester.

Fig. 2 - Cod being hauled aboard over the fairlead drum. The crewman is one of five aboard the vessel. Hauling of the gear is usually started at daybreak and takes 2 to 3 hours.

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Fig. 3 - Power is supplied to the net-lifter rotor, pictured here, by a small gasoline engine. The fisherman in the foreground is helping to free the gill net from the pawls which grip the net as it comes around the rotor.

Fig. 5 - Boxes of gill nets being prepared for setting over the stern of the Phyllis A. The setting of the string of nets, which in this case consists of 14 boxes, is done with the vessel proceeding at approximately 6 to 8 knots. A string of gear may stretch 3 to 4 miles over the bottom. The site at which the set is made is chosen on the basis of daily catches and previous experience. Sink gill nets are often fished over hard or rock bottom where trawling is not practicable and in depths of 20 to 40 fathoms.

Fig. 4 - Large cod being cleared from enmeshing twine by a crewman. The net-hauling operation is continuous, with the net coming aboard over the port side of the vessel. The fish are cleared from the webbing, and temporarily stowed in the hold, and the gill nets are placed in boxes for further clearing and repairing ashore.

Fig. 6 - After the first string of gear has been taken aboard the vessel, another string is set. The catch of fish from the first string is then forked from the hold of the vessel to the deck for dressing. Daily catches--usually consisting principally of cod, pollock, and haddock--range from about 1,500 to 5,000 pounds.

Fig. 7 - All fish are eviscerated and the larger fish are beheaded prior to landing. The fish are landed in top condition, usually less than six hours after they are brought on deck.

Fig. 9 - After arrival in port, the nets are unloaded from the vessel for inspection and drying ashore.

Fig. 11 - One section of the net on a rack. Twine is mostly 6-inch stretched mesh. Plastic floats are used on the float line and hammered leads on the lead line.

Fig. 8 - A gull gets "his share" as the catch is dressed while the Phyllis A. steams back to Gloucester.

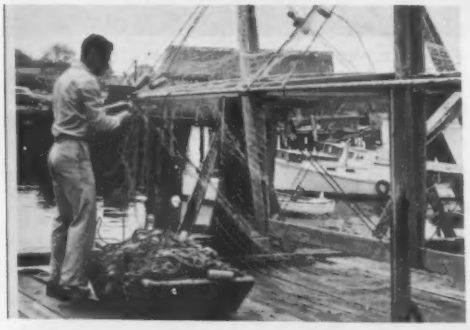

Fig. 10 - The sections of gill net are placed on racks for drying and mending, if needed. Three "sets" (strings) of gear are required--one ashore, one fishing, and the third aboard the boat.

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Alaska Exploratory Fishery Program

COMMERCIAL POTENTIAL OF BOTTOM FISH IN SOUTHEASTERN ALASKA STUDIED:

M/V "New Hope" Cruise 60-1: The U. S. Bureau of Commercial Fisheries chartered vessel New Hope was expected to depart from Ketchikan, Sept. 6, 1960, for 6 weeks of exploratory bottom trawling west of Prince of Wales Island in Southeastern Alaska from Cape Muzon to Cape Ommaney. This is the first of a series of cruises under a new program initiated by the Bureau to assist in the development of Alaska's fishery resource.

The purpose of the cruise was to evaluate the commercial potential of bottom fish during a specific late summer period. Earlier cruises in 1956 and 1957 furnished basic topography data and exploratory fishing data for early spring and late fall seasons.

Records were to be maintained on certain meteorological and oceanographic data. Lengths and weights of important commercial species were to be logged and fishing locations charted.

A standard 400-mesh "eastern" otter trawl (commonly used on the West Coast) was to be fished as in a typical commercial fishing operation.

American Fisheries Advisory Committee

FIVE MAJOR PROBLEMS DISCUSSED AT AUGUST MEETING:

Five major problems pertaining to the Nation's commercial fisheries were discussed at a meeting of the American Fisheries Advisory Committee. The meeting, eleventh of the group, was held in Seattle, Wash., in August 1960, the U. S. Bureau of Commercial Fisheries reported on September 22, 1960.

The major problems were:

(1) The actual and potential effect of foreign fishing activities in the eastern part of the Bering Sea on the United States fishery.

(2) The effects of territorial sea adjustments on the fisheries of the Pacific Northwest area.

(3) The increasing impact of dams and other multiple water-use projects upon the commercial fisheries.

(4) A review of legislation introduced in the 86th Congress to modify the Saltonstall-Kennedy Act, which is an act designed to aid the domestic commercial fishing industry to meet its problems in the biological, technological, and marketing fields.

(5) A discussion of the relative balance achieved by the Bureau of Commercial Fisheries in its allocations of Saltonstall-Kennedy funds to various activities and programs designed to help the fishing industry help itself, but with emphasis on the marketing activities of the Bureau.

The Committee expressed growing and continuing concern over the increased foreign fishing activities in the Eastern Bering Sea and urged the Bureau of Commercial Fisheries to consider the possibilities of overexploitation and the resultant potential depletion of fish stocks.

Inquiries were made relative to the extent of present American fishing operations in the area, the possible short- and long-range effects of foreign fishing activities on the historic fishing rights of United States citizens, and the potential areas of disagreement between the United States and foreign governments in the future.

The Committee also urged the Bureau to secure all possible data relative to the species and the amounts harvested and to particularly guard against any encroachment on the halibut grounds farther to the south which have been historically harvested on a sustained

yield basis by United States and Canadian fishermen under joint conservation policies.

In regard to territorial waters problems, the Committee recommended that since there was no agreement reached at the last International Conference on the Law of the Sea on fishing rights, the United States should stay with its original position of holding to the three-mile limit.

The Committee also suggested that consideration should be given to bilateral or multilateral agreements with foreign nations relative to the utilization of fishery resources off foreign shores.

The Committee placed emphasis on the value of research and recommended continued research on alternate methods of replacing lost or downgraded salmon spawning areas resulting from multiple water-use projects.

The Committee questioned the desirability of recent Congressional legislation proposing the apportionment of Saltonstall-Kennedy funds to state conservation agencies, educational institutions, and private research organizations, expressing the belief that the present contract program of the Bureau of Commercial Fisheries was more desirable from the standpoint of greatest immediate benefit to the industry and public.

In the discussions concerning allocations of funds to various Bureau activities and work areas, the Committee stated that, within the present framework of financial support from Saltonstall-Kennedy funds, it was their view that a proper balance has been achieved in the allocation of the Saltonstall-Kennedy funds.

Note: Also see Commercial Fisheries Review, May 1960 p. 14.

American Samoa

TUNA LANDINGS, AUGUST 1960:

In August 1960, tuna landings by Japanese and South Korean vessels fishing for the tuna cannery in American Samoa totaled 2.7 million pounds--an increase of 27.8 percent as compared with the 2.1 million pounds landed in August 1959. Landings for January-August 1960 of 18.1 million pounds were 6.6 percent higher than the 17.0 million pounds landed during the first eight months of 1959.

American Samoa Tuna Landings, August 1960

Species	August		Jan.-Aug.	
	1960	1959	1960	1959
	(1,000 lbs.)			
Albacore	2,439	1,921	15,094	13,207
Yellowfin	260	207	1,861	3,109
Big-eyed	43	13	1,155	685
Skipjack	-	4	10	4
Total	2,742	2,145	18,120	17,005

Note: Majority of the tuna was landed by Japanese long-line vessels; a small amount was landed by a South Korean long-line vessel.

Byproducts

U. S. PRODUCTION AND IMPORTS OF FISH MEAL AND SOLUBLES, JANUARY-JULY 1960:

During the first seven months of 1960, the United States production of fish meal reported to the U. S. Bureau of Commercial Fisheries amounted to 130,443 short tons as compared with 144,770 tons produced by the same firms in January-July last year. Imports of 79,506 tons for the same period were down sharply from the 105,004 tons imported in January-July 1959.

Table 1 - U. S. Supply of Fish Meal and Solubles, 1960 and 1959

Item	January-July		Total
	1960	1959	1959
	(Tons)		
FISH MEAL			
Domestic production:			
Menhaden	105,246	113,104	223,893
Tuna and mackerel	13,303	12,630	25,380
Herring, Alaska	3,040	5,791	8,094
Other	8,854	13,245	49,184
Total production	1/130,443	1/144,770	306,551
Imports:			
Canada	24,421	32,089	39,033
Peru	40,739	37,488	49,923
Chile	9,113	4,995	5,104
Angola	-	20,738	20,738
Union of South Africa	4,930	3,374	9,727
Other Countries	303	6,320	8,400
Total imports	79,506	105,004	132,925
Fish meal supply	209,949	249,774	439,476
FISH SOLUBLES (wet weight)			
Domestic production 2/	54,647	89,051	165,359
Imports:			
Canada	691	1,243	1,660
Denmark	1,858	10,307	18,723
Other Countries	65	3,213	6,247
Total imports	2,614	14,763	26,630
Fish solubles supply	57,261	103,814	191,989

1/Based on reports from firms which accounted for 92 percent of the 1959 production.
2/Includes production of homogenized-condensed fish.

Similar declines occurred in the domestic production and imports of fish solubles. The January-July production of solubles of 54,647 tons was 34,404 tons less than for the same period the previous year. Imports of solubles during the first seven months of 1960 amounted to 2,614 tons as compared with 14,763 tons in the same period of 1959.

California

AERIAL CENSUS OF SEA LIONS:

Airplane Spotting Flight 60-13-Sea Lion Census: An aerial survey of the coast and offshore islands from the Oregon border to Pt. Conception was conducted by the California Department of Fish and Game Twin Beechcraft on June 8-9 and 13-15, 1960, to estimate abundance of sea lions in California.

Sea Lion

During the five flights made along the Northern California coast, concentrations of sea lions were found on St. George Reef Islands, Sugar Loaf off Cape Mendocino, Sea Lion Rock off the Mattole River, Fort Ross Reef, Point Reyes, the Farallon Islands, Ano Nuevo, Santa Cruz Point, Point Lobos, Partington Point, and Point Sal. Individuals and small numbers were found intermittently between those places.

Unfavorable weather conditions hampered the census operations, with coastal fog prevailing during June causing delays and interruptions to the flight. Photographs of concentrations of sea lions were taken at areas where significant numbers of animals were encountered. Combined with this were actual counts and estimates made at other areas where it was not worthwhile to make photographs.

Photographic equipment used included a 9" x 9" vertical aerial camera with 12" cone mounted in the plane, a K20 manual-operated aerial camera, and a 35-mm. color camera.

Estimates of the Southern California population have been postponed. Poor flying conditions combined with other aircraft commitments extended the operation beyond the allotted flight schedule.

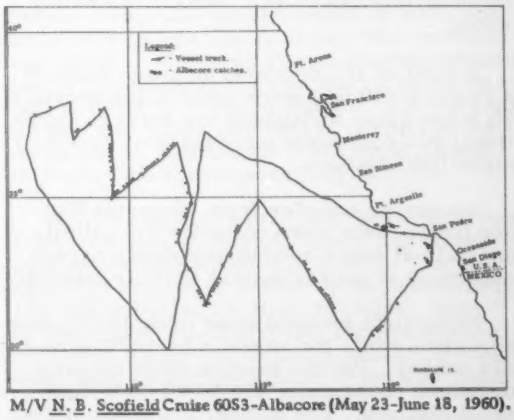
* * * * *

ALBACORE TUNA MIGRATION OFF PACIFIC COAST STUDIED:

M/V "N. B. Scofield" Cruise 60S3-Albacore: The high seas area off California and Baja California within the latitudes 30° N. and 38° N. and inshore from 134° W. longitude were surveyed by the California Department of Fish and Game research vessel N. B. Scofield from May 23-June 18, 1960. The objectives were: (1) to explore the offshore area prior to the commercial albacore season in an attempt to intercept and determine the migration route or routes of albacore schools approaching the Pacific Coast; (2) to tag and release albacore; and (3) to gather biological and oceanographic data.

Most of the 3,000-mile survey track was scouted during daylight hours using surface trolling gear.

The first albacore were taken on June 4 approximately 500 miles west of San Francisco (latitude 37° 43' N., longitude 132° 45'



M/V N. B. Scofield Cruise 60S3-Albacore (May 23-June 18, 1960).

W.). Subsequent catches of 1 to 26 fish were made each day while running a southeasterly pattern toward the coast. The total catch was 154 albacore.

The majority (90 percent) of the fish averaged about 12 pounds each. Most of the rest were larger fish ranging from about 18 to 30 pounds, and were caught primarily in the southeastern portion of the survey area.

Stomachs of untagged fish showed no evidence of recent heavy feeding. Among the more common organisms observed were: Pacific saury, squid, Pacific jack mackerel, and larval lantern fish.

All of the albacore in suitable condition when hauled aboard were tagged. Experiments designed to test the recovery rate of "spaghetti" tags with that of dart tags were continued. The two types used alternately resulted in a release of 38 "spaghetti" and 36 dart tags. The greatest number of fish tagged at one position was six.

Sea surface temperatures varied from 10.7° to 18.5° C. (51.3° to 65.3° F.). The coolest water extended from the vicinity of Santa Cruz Island to about 200 miles W. by N. of San Miguel Island, while warmest temperatures were found in the southwestern area 400 to 500 miles from Point Arguello.

All albacore were caught within a temperature range of 15.3° to 17.9° C. (59.5°-64.2° F.). The majority (83 percent) was taken in 15.9° to 17.1° C. (60.6° - 62.8° F.) water.

A total of 150 bathythermograph casts to a depth of 400 feet were made approximately 20 miles apart throughout the survey. Additional 900-foot casts were made at several night-light stations.

Sea-water samples from 10-meter Nansen bottle casts were collected for salinity analysis at every second bathythermograph station or at approximately 40-mile intervals.

Night-light stations were occupied on nine occasions while the vessel was drifting on a sea anchor. Pacific sauries were the only organism noted under the 1,500-watt light at all stations. The number attracted varied from 2 to about 100. Organisms occurring at fewer stations were Pacific jack mackerel, lanternfish, squid and several species of salps.

Daytime observations were considered typical for the area. Albatross and storm petrels were present in small numbers most of the time. Their actions did not appear different in areas where albacore were caught. Large concentrations of Velella lata were observed in two localities. Mammals were rarely observed. Of interest was the occurrence of glass Japanese net floats. A few large and numerous small ones were observed.

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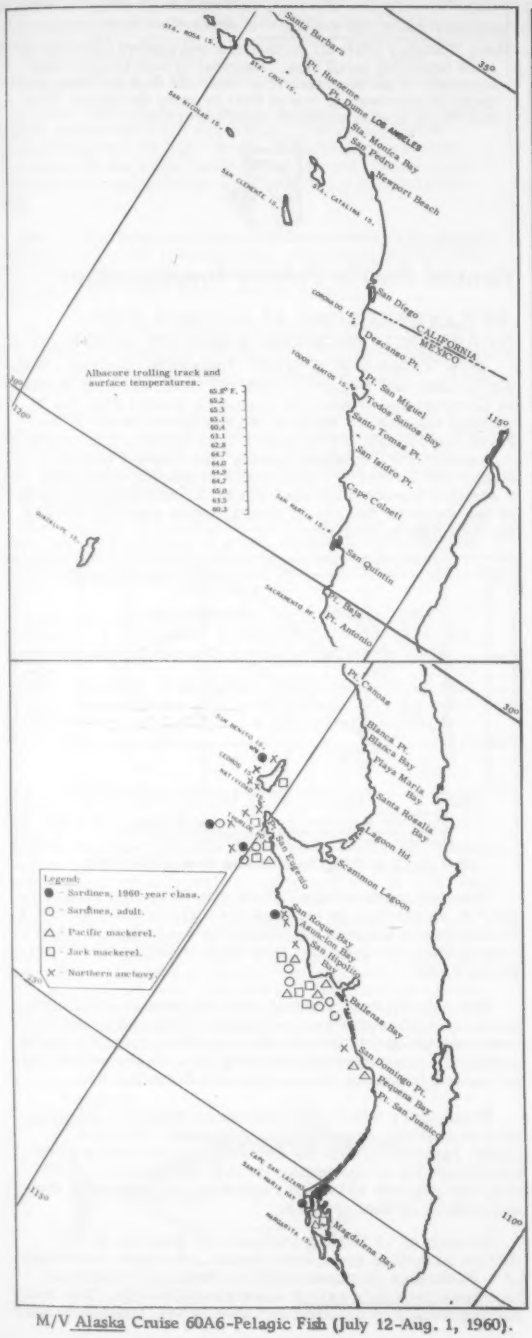
PELAGIC FISH POPULATION SURVEY CONTINUED:

M/V "Alaska" Cruise 60A6-Pelagic Fish: The coastal waters off Baja California from Magdalena Bay to Cedros Island were surveyed (July 12-August 1, 1960) by the California Department of Fish and Game research vessel Alaska. The objectives were: (1) to survey the sardine population to determine the amount of recruitment from the 1960 spawning and to measure the density of older fish; (2) to sample sardines for age analysis; (3) to sample Pacific mackerel, jack mackerel, and anchovies for age and distribution studies; (4) to collect live sardines for genetic studies by the U. S. Bureau of Commercial Fisheries Laboratory at La Jolla; and (5) to troll for albacore on the southern extremity of the albacore fishing grounds.

Of the 66 night-light stations occupied, sardines were taken on 12, anchovies on 12, jack mackerel on 9, and Pacific mackerel on 8. In the 411 miles of scouting, 881 anchovy, 3 yellowtail, and 8 unidentified fish schools were sighted.

Sardines of the 1960 year-class were taken on 5 stations. Three samples were taken from fish schools that were predominantly anchovy. Very few young sardines were present at the other 2 stations and none were observed during scouting. Adult sardines were taken on 9 stations mostly in Ballenas Bay. During daylight anchorage in this area more than 100 schools of adult fish were observed.

Anchovies were present in unusually large numbers over the entire area covered. In addition to the schools observed during night



M/V Alaska Cruise 60A6-Pelagic Fish (July 12-Aug. 1, 1960).

scouting, hundreds were seen during daylight hours. They were from 2 to 7 miles offshore in dense to thinly-scattered schools. Fish from some of the dense schools could be brailed during daytime anchorage. The number of samples taken on night-light stations was not representative because the majority of the schools was negatively phototropic. The dominant size group was between 80 and 105 mm.

Larger fish were present only around Cedros Island.

Several thousand adult sardines from Magdalena Bay were delivered alive to the U. S. Bureau of Commercial Fisheries, La Jolla.

A special trolling track was made through previously productive albacore fishing grounds off northern Baja California. No fish were caught or seen.

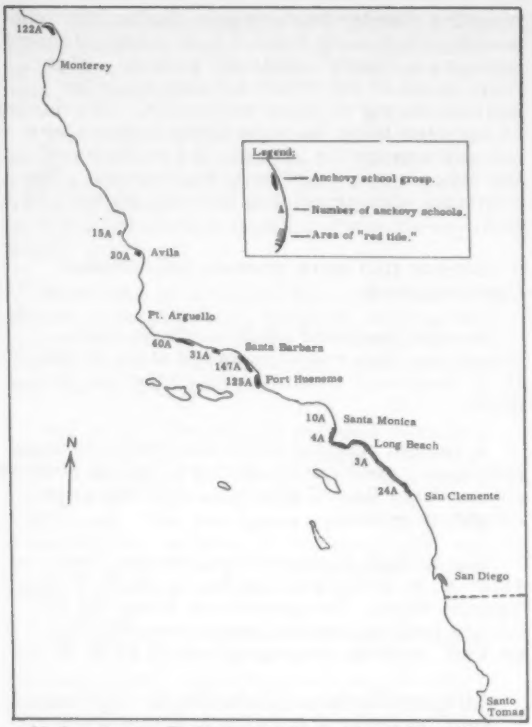
Sea surface temperatures ranged from 78.6° F. at Point San Juanico to 56.1° F. at Thurloe Head. Temperatures along the albacore trolling track ranged from 65.8° to 60.4° F. with an average of about 64.0° F.

Airplane Spotting Flight 60-16 - Pelagic Fish: The inshore area from Punta Santo Tomas, Baja California, to Santa Cruz, Calif., was surveyed from the air (July 22, 25, and 26, 1960) by the Department's Cessna "180" 3632C, to determine the distribution and abundance of pelagic fish schools.

Fog obscured most of the central California coast. Aerial observations were possible only in four small areas--the northern one-third of Monterey Bay, a narrow inshore band from Carmel to Point Sur, a small section of coast near Point Buchon, and San Luis Obispo Bay in the immediate vicinity of the Avila piers. Conditions from Santo Tomas to Point Conception were only fair.

Anchovy schools were most numerous from Port Hueneme to Gaviota where 343 were counted during two days of flying. The observable section of Monterey Bay contained 122 thin schools, all close to shore. Only 41 were seen south of Point Dume and none below San Clemente. Schools containing species other than the northern anchovy were not seen.

Moderate to severe red-water conditions prevailed from Point Dume to San Clemente,



Airplane Spotting Flight 60-16 (July 22, 25, and 26, 1960).

with the heaviest blooms in the Los Angeles-Long Beach Harbor area and from Newport Beach to Dana Point.

Note: Also see Commercial Fisheries Review, Sept. 1960 p. 15.

Cans--Shipments for Fishery Products, January- July 1960

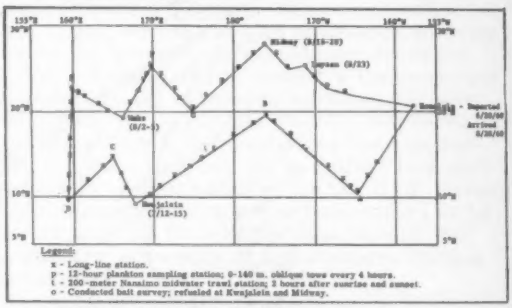
Total shipments of metal cans during January-July 1960 amounted to 74,727 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 66,673 tons in the same period a year ago. The increase of about 12.1 percent in the total shipments of metal cans January-July this year as compared with the same period of 1959 was probably due to the sharp increase in the Alaska canned salmon pack.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor 23.0 base boxes of steel equal one short ton of steel.

Central Pacific Fishery Investigations

BIOLOGISTS SEEK ALBACORE TUNA SPAWNING GROUNDS WEST OF HAWAII:

M/V "Charles H. Gilbert" Cruise 48: During a 70-day cruise that began on June 20, 1960, the U. S. Bureau of Commercial Fisheries research vessel Charles H. Gilbert surveyed a wide area (see chart) west of the Hawaiian Islands for albacore tuna spawning grounds. A cooperating Japanese agency (the Nankai Regional Fisheries Research Laboratory at Kochi) conducted a similar survey with the research vessel Shunyo Maru in the western Pacific in coordination with the work of the Charles H. Gilbert.



M/V Charles H. Gilbert Cruise 48 (June 20--August 28, 1960).

The survey area was fished with long-line fishing gear in an attempt to capture sexually-mature albacore. In addition to long-lining, the vessel conducted night-light fishing stations and midwater trawling to capture young tunas.

The survey area yielded poor catches of adult albacore. But the survey area was not expected to yield commercial quantities of albacore, the scientists being primarily interested in obtaining data on the sexual maturity and fecundity of the albacore from the area.

While there were but a few large albacore taken, the net collections yielded considerable numbers of larval tuna. Although the collections have not yet been studied, some of these may be larval albacore. If so, this will provide evidence regarding the spawning area and season of this species.

At each of 38 fishing stations, 60 baskets of 210-fathom long-line gear were fished. Baskets consisted of a 20-fathom floatline and 11 3-fathom droppers. Sauries (Cololabis saira) were used for bait. The best fishing occurred between 10° and 20° N. latitude in the

area between the Hawaiian Islands and Kwajalein--big-eyed and skipjack tuna predominated. Albacore catches were poor and scattered throughout the survey area. Of the six albacore taken, only one was a female. The ovaries appeared to be in the late developing stage.

Fifteen "Nanaimo" midwater trawl hauls were made before failure of the trawl winch. Generally, trawl hauls during the daylight hours yielded poor catches. The catch in the night hauls, although not spectacular, yielded more organisms, mainly shrimp and lanternfish.

Four to 500 buckets of Marshallese sardine (Harengula kunzei) were seen at Kwajalein. Also seen were some iao (Atherinidae), but no estimate of abundance was obtained since these were seen at night.

At Wake Island, very large concentrations of oama (Mullidae) were observed all along the shores of the lagoon. Also, an estimated 100 buckets of 4- to 5-inch aholehole (Kuhliidae) were seen in the lagoon.

At Midway, about 120 buckets of iao (Pranesus insularum) were seen along the northeast and eastern shores of Sand Island. Isolated smaller schools of piha (Spratelloides delicatulus) and about 400-500 buckets of aholehole were also counted.

Bait survey at Laysan Island showed that there were about 100-200 buckets of small aholehole (2-3 inches) and about 400-500 buckets of large aholehole (5-10 inches) all along the shore.

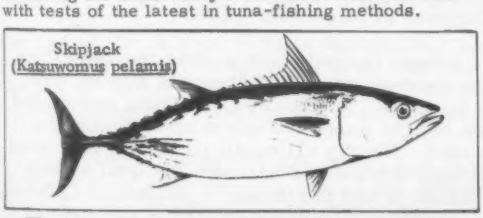
Long-line fishing was poor. The total catch was 6 albacore, 6 yellowfin, 28 big-eyed, 15 skipjack, 44 spearfish, 87 sharks, and 34 miscellaneous fishes.

Two yellowfin, 2 skipjack, and 12 unidentified tuna schools were sighted during the cruise. Direct and incidental trolling produced 4 dolphin and 2 wahoo.

* * * * *

REACTION OF SKIPJACK TUNA TO NETS TESTED:

The skipjack tuna found off Oahu's Waianae coast in September 1960 were confronted for the first time with a 300-foot deep wall of nylon net, set in their path by the crew of the U. S. Bureau of Commercial Fisheries' research vessel Charles H. Gilbert. Most of the skipjack managed to avoid the strange barrier--only 10 fish were entangled and landed in the huge gill net. The biologists of the Bureau's Honolulu Biological Laboratory, who planned and directed the experiment, were not particularly discouraged by this small catch, for the trial was conceived as only a first step in linking the Laboratory's studies of tuna behavior with tests of the latest in tuna-fishing methods.


Skipjack
(Katsuwomus pelamis)

The idea was to see how Hawaiian tuna schools, which are notoriously fast and shifty, would react to a net under the conditions of water clarity and water temperature which obtain in Hawaiian waters. The Charles H. Gilbert is uniquely equipped for such studies as it is the only tuna-fishing vessel in the world with observation windows in the hull below the waterline. The biologists were not content, however, with confining their observations to those windows, but put on their diving masks and went into the sea with the net to spy on the tuna in their own element.

The experiment has significance in a larger picture of increasingly worldwide competition among tuna fishermen to supply the United States market. This competition stimulates a constant search for more efficient methods of harvesting tuna that has in the past few years brought almost revolutionary changes to the Southern California tuna fishing industry. New tools, such as larger and stronger nets made of nylon and power equipment for hauling the nets, and the new techniques that these tools have brought forth, are enabling the California fishermen to produce tuna more efficiently and more cheaply than has ever been possible when live-bait and pole fishing were employed. Thus their competitive position has been increased over that of Hawaiian fishermen, who still rely on pole-and-line fishing methods.

It is generally thought that the success of net fishing methods for tuna off the West Coast is due to the fact that the deep seines reach down through the thin layer of warm surface water in which the tuna live. The fast-swimming fish, which otherwise would find it easy to escape under the curtain of netting, are stopped by the cold water that they run into as soon as they dive.

Around Hawaii the warm surface water extends down much deeper than it does off the West Coast. The Laboratory's first problem was, therefore, to find out whether a net could be set deep enough in Hawaiian waters to reach water temperatures that would turn back an escaping tuna school. The results of the experiment, which consisted of only four sets on small, fast-moving schools with a make-shift net, are not expected to be conclusive, but the Laboratory's scientists plan to make further trials along similar lines in search of knowledge that will enable Hawaii's tuna fishermen to bring their productive efficiency up to the most advanced level.

* * * * *

TAGGING RETURNS INDICATE THAT THE SKIPJACK TUNA IS NOT A WIDE-RANGING SPECIES:

Over 13,000 skipjack tuna have been tagged in Hawaiian waters with the D-2 dart tag, since the initiation of the tuna research program by the Honolulu Laboratory of the U. S. Bureau of Commercial Fisheries. Although the recoveries--nearly 1,300--have indicated considerable movement among the islands, there are no records of recapture of the tagged fish in any other fishery. The Hawaiian skipjack fishery is seasonal; the bulk of the annual catch is made between May and September. Although it is hypothesized that these fish enter the Hawaiian area in the spring and leave in the fall, there has been a lack of returns from other areas of skipjack tagged in the Hawaiian waters, a lack of positive evidence that fish recovered one or more seasons after tagging have actually been away during the interim, and a lack of recoveries in Hawaiian waters of skipjack tagged elsewhere in the Pacific. As a result, biologists have increased their efforts to find out where they come from and where they go.

In April 1960, 46 skipjack were caught, tagged, and released from the Bureau's research vessel, Charles

H. Gilbert, near Roca Partida of the Revillagigedo Islands group, which lie off the west coast of Mexico. Although the results of this limited tagging effort has failed to provide any answers, it is interesting to note that 11 of the tagged tuna were recaptured within two months after release and all but one from within the area of release. One fish was recovered about 180 miles north of the release area.

The comparatively high percentage of recovery of tagged skipjack may reflect the existence of a resident population associated with a group of islands, or their movement may have been temporarily restricted by certain environmental factors. In May 1958, 2,000 skipjack were tagged and released in an area off Hilo, Hawaii. A total of 431 of the tagged fish, or 21.5 percent were recaptured within 3 months, with all but 2 from the same general area of release. These fish may have been "trapped" in a patch of low salinity water surrounded by water of higher salinity and, presumably, also differing in other characteristics. Later returns showed that at least some of the skipjack tagged off Hilo regrouped with other schools and moved northwesterly along the Hawaiian archipelago.

Tag returns from individual schools suggest that, normally, the skipjack in Hawaiian waters remain within a school for one month or less, then at least some of the school break off, move into new areas, and regroup with other fish or schools. From the releases off Hilo and Mexico, however, it is evident that there are situations, possibly environmentally conditioned, where the schools remain intact and within a restricted area for at least 2 or 3 months and thus are readily available to capture by fishermen.

Chicago

CONSUMPTION OF FROZEN FISH AND SHELLFISH IN RESTAURANTS AND INSTITUTIONS:

Chicago was one of ten selected cities in which a survey was undertaken to obtain information on the consumption of frozen processed fish and shellfish in institutions and public eating places. A total of 842 establishments were surveyed in that city. About four-fifths of all the establishments in Chicago bought some kind of frozen fishery products in the 12 months proceeding November 1958, the month the survey was made. Of this group, about 74 percent said they had bought frozen processed fishery products during the period.

Further breakdown of frozen fishery products purchases in November 1958 shows that 46 percent of the establishments surveyed bought frozen processed fish, 35 percent bought frozen processed shellfish, and 13 percent bought frozen portions. The incidence of use of frozen processed fishery products, by institutions (such as schools and hospitals) was greater than restaurants. Of the ten cities in the survey, Chicago ranked fourth in terms of the percentage of all establishments buying frozen processed fishery products during the month of the survey. Chicago establishments most typically bought frozen processed fish in 5-pound packages, and frying was the most popular method of cooking.

Among the establishments using frozen processed shellfish, two-thirds bought breaded shrimp in November 1958, and one-fourth bought raw shrimp. Large quantities of both items were purchased. But breaded shrimp and raw shrimp also were bought widely, and in large quantities, in all the other cities included in the survey.

As with frozen processed fish, the leading shellfish items were also most often bought in 5-pound packages in Chicago. Frying was the most popular method of cooking shellfish.

Only about one-eighth of the establishments surveyed in Chicago bought portions during the month of the survey. This included 73 restaurants and 35 institutions. About 14,000 pounds of portions were purchased by these establishments in November 1958.

Chicago ranked ninth among the ten cities in percentage of establishments buying frozen portions. In Chicago, portions were most often bought uncooked-plain and uncooked-breaded. Nearly all establishments indicated that they were satisfied with the quality and condition of the portions.

About 10 percent of the users of portions in Chicago indicated that the quality was better than that of other frozen processed fish.

Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES: JANUARY-JULY 1960: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 1.9 million pounds (value $1.1 million) of fresh and frozen fishery products were purchased in July 1960 by the Military Subsistence Supply Agency. This was lower than the quantity purchased in June by 29.8 percent and 16.0 percent under the amount purchased in July 1959. The value of the purchases in July 1960 was lower by 8.3 percent as compared with June and 9.9 percent less than for July 1959.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, July 1960 with Comparisons

QUANTITY				VALUE			
July		Jan.-July		July		Jan.-July	
1960	1959	1960	1959	1960	1959	1960	1959
(1,000 Lbs.)				($1,000)			
1,909	2,272	13,649	13,618	1,084	1,203	7,070	7,190

During the first seven months of 1960 purchases totaled 13.6 million pounds (valued at $7.1 million)--a decrease of 0.2 percent in quantity and 1.7 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in July 1960 averaged 56.8 cents a pound, about 12.8 cents more than the 44.0 cents paid in June and 3.4 cents more than the 52.9 cents paid during July 1959.

Canned Fishery Products: Tuna was the only canned fishery product purchased for the use of the Armed Forces during July this year. In the first seven months of 1960 purchases of canned fish were lower by 27.2 percent as compared with the same period in 1959.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, July 1960 with Comparisons

Product	QUANTITY				VALUE			
	July		Jan.-July		July		Jan.-July	
	1960	1959	1960	1959	1960	1959	1960	1959
	(1,000 Lbs.)				($1,000)			
Tuna	481	150	1,930	1,982	204	70	860	938
Salmon	-	1	3	13	-	1	2	10
Sardine	-	107	84	776	-	16	35	116

JANUARY-AUGUST 1960: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the Department of Defense, 2.4 million pounds (value $1.2 million) of fresh and frozen fishery products were purchased in August 1960 by the Military Subsistence Supply Agency. This exceeded the quantity purchased in July by 24.5 percent and was 12.5 percent higher than the amount purchased in August 1959. The value of the purchases in August 1960 was higher by 9.8 percent as compared with July and 38.5 percent above August 1959.

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, August 1960 with Comparisons

QUANTITY				VALUE			
Aug.		Jan.-Aug.		Aug.		Jan.-Aug.	
1960	1959	1960	1959	1960	1959	1960	1959
(1,000 Lbs.)				($1,000)			
2,337	2,112	16,036	15,730	1,190	859	8,260	8,049

During the first eight months of 1960 purchases totaled 16.0 million pounds (valued at $8.3 million)--an increase of 1.9 percent in quantity and 2.6 percent in value as compared with the similar period in 1959.

Prices paid for fresh and frozen fishery products by the Department of Defense in August 1960 averaged 50.1 cents a pound, about 1.7 cents less than the 51.8 cents paid in July but 9.4 cents higher than the 40.7 cents paid during August 1959.

Canned Fishery Products: Tuna was the principal canned fishery product purchased for the use of the Armed Forces during August this year. In the first eight months of 1960 purchases of canned tuna were up 5.7 percent but purchases of both canned salmon and sardines were sharply lower as compared with the same period of 1959.

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, August 1960 with Comparisons

Product	QUANTITY				VALUE			
	Aug.		Jan.-Aug.		Aug.		Jan.-Aug.	
	1960	1959	1960	1959	1960	1959	1960	1959
	(1,000 Lbs.)				($1,000)			
Tuna	324	150	2,254	2,132	133	59	993	997
Salmon	1	2	4	15	1	2	3	11
Sardine	15	194	99	970	6	27	41	143

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

Films

SALMON FILM WINS HONORS AT EDINBURGH INTERNATIONAL FILM FESTIVAL: Salmon - Catch to Can, a 14-minute, sound color film sponsored by the Canned Salmon Institute and produced and distributed by the

U. S. Bureau of Commercial Fisheries was accorded honors at the Edinburgh, Scotland, 14th Annual International Film Festival, the Department of the Interior announced on September 29, 1960.

This is the third Bureau of Commercial Fisheries' film to receive honors at Edinburgh Festivals in recent years. An appropriate certificate will be presented during the winter to the Secretary of the Interior. Such presentation is usually made by the British Ambassador.

The award consists of being selected for showing at the Edinburgh Festival where films from about 30 nations compete for a place on the coveted program.

Salmon - Catch to Can was filmed primarily in Alaska. Among other scenes portrayed are the fish ladders at Bonneville Dam on the picturesque Columbia River. The picture shows the life history of the salmon; the three most prominent methods of harvest--purse-seining, gill-netting, and trolling; fishery management programs to assure a continuing resource; a glimpse of the canning process; and a "lead-in" to a second 14-minute film entitled Take a Can of Salmon.

The second film is a cookery presentation and may be used with the first one or separately. Both films are supplemented by a full-color recipe booklet also entitled Take a Can of Salmon[1/]. Motion picture facilities of MPO Productions, New York City, a commercial motion picture producer, were used in making the honor-winning film.

1/For sale at 15 cents a copy by the U. S. Government Printing Office, Washington 25, D. C.

Fish Kills

NATIONWIDE STATISTICAL REPORTING SYSTEM SET UP:

The U. S. Public Health Service early this year started a nationwide system for reporting the frequency and locations of fish killed by pollution. The project, a cooperative effort between the Public Health Service, the U. S. Fish and Wildlife Service, and State conservation agencies, is the first national tabulation of pollution fish kills that has been undertaken.

In announcing the project, the Surgeon General said it will be an effective means of obtaining additional basic information needed to determine the effects of pollution on the Nation's water resources, as required by the Federal Water Pollution Control Act. All State fish and game conservation agencies are being asked to provide continuing reports of fish killed by pollution as they occur in the Nation's rivers, lakes, and coastal waters. Reports will be made directly to the Public Health Service in Washington, D. C.

The Public Health Service will furnish the U. S. Fish and Wildlife Service with a copy of each report received, as it is received. The two agencies will cooperate in planning fish-kill statistics so they can be used in fish and game management as well as water pollution control.

Quarterly and annual reports of fish kills, listing numbers, locations and causes, when known, will be published. These reports will be distributed to the cooperating agencies, organizations, and individuals who request them.

Fish Meal

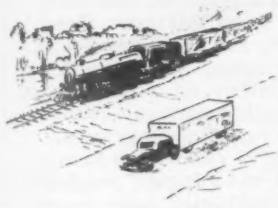
FREIGHT RATES FOR MEAL AND SCRAP REDUCED:

Effective October 4, 1960, freight rates were reduced on fish meal and fish scrap originating from South Atlantic and Gulf points ranging from Beaufort (N. C.)-West Port Arthur (Tex.) to destinations in Illinois, Kentucky, and Missouri. The new rates for domestic meal are 6 cents per hundred pounds over the previously-published rates for imports shipped from Southern ports, such as New Orleans, La., Jacksonville, Fla. Because imports are subject to port charges, the net effect is equalization of the inland transportation cost for both domestic and imported meal traffic. For intermediate destination points, the rates will be no higher than the rate for the next more distant point as published in the tariffs.

In November 1959 rates on imported fish meal were reduced from Gulf ports to Midwestern points. As a result, the cost for shipping imported fish meal was about $5 to $19 a ton less than for shipping domestic fish

meal. This freight rate advantage for imported fish meal with an increased foreign supply worked to the disadvantage of domestic fish meal manufacturers.

During the past several months members of the Industrial Products Traffic Committee of the National Fisheries Institute, with the assistance of a representative of the U. S. Bureau of Commercial Fisheries, met with representatives of western, southern, and eastern railroads to explain the depressed conditions of the fish-meal industry. After several public hearings as well as informal meetings, the carrier rate-making groups approved the new reduced freight rates.



Florida

FISHERIES RESEARCH:

The Marine Laboratory of the University of Miami is conducting research on fisheries. Research of interest to commercial fisheries contained in the Laboratory's June 1960 Salt Water Fisheries Newsletter follows:

Shrimp Larvae: The larval life history of the pink shrimp has been studied at The Marine Laboratory with the support of the U. S. Fish and Wildlife Service. During the first quarter of 1960 a report was completed which described the shrimp larval stages.

The completion of this fundamental work leads to the next phase, involving the distribution of each stage of the larvae (11 in number) geographically and seasonally. This will give information on how the larvae get from the offshore spawning grounds to the estuarine nursery areas at the south end of the Florida peninsula. This question needs study since work on the current system in Florida Bay indicates that no onshore currents exist to carry non-swimming larvae inshore.

Spotted Sea Trout Tagging: Research on spotted sea trout and the ecology of the Everglades National Park, the same estuary which serves as nursery ground for the Tortugas shrimp, is being supported by the Florida State Board of Conservation. The study has chiefly involved research on migration and growth of the sea trout populations from Ft. Myers to Appalachicola. By March 31, 5,348 tagged trout had been released. Two types of tags were used, internal tags of green plastic and the same tag to which a small piece of yellow plastic tubing is attached, the latter protruding through the hole in the fish's belly and drawing attention to the presence of the tag within. A total of 445 tagged fish had been reported by the end of March 1960, this being 8.3 percent of the total released. As before, few sea trout had moved very far because some 96 percent were caught within 30 miles of the place of tagging.

Frozen Shrimp Keeping Qualities: Tests have been made of the usefulness of dried extracts of okra (the green vegetable) in improving color, texture, and keeping qualities of frozen shrimp. Tests are also being made of the effects of freezing, thawing, and refreezing of shrimp on the bacterial count.

Note: See Commercial Fisheries Review, March 1959 p. 34.

Foreign Fishery Developments

COMMERCIAL FISHERIES BUREAU EMPLOYEE REVIEWS FISHERY MATTERS IN WESTERN EUROPE:

A review of fishery reporting by United States embassies and consulates was made by Dr. Sidney Shapiro, Chief, Branch of Foreign Fisheries and Trade, U. S. Bureau of Commercial Fisheries. He left for Europe on September 15, 1960. He planned to talk to government and industry officials about "Common Market" and "Outer Seven" fishery trade problems and brief the Interior representative on the United States Delegation to the GATT trade agreement negotiations in Geneva, Switzerland.

The U. S. Bureau of Commercial Fisheries has been working with the Department of State to improve reporting on foreign fishery developments. The Bureau is now undertaking a complete revision of the fishery reporting requirements in an effort to expand and develop useful and urgently-needed information on foreign developments as they affect the United States fishing industry. Timely and accurate reporting of information useful to United States firms was among the rec-

ommendations made by representatives of the fishing industry at a special conference on fishery export trade, held in Washington on June 20, 1960.

Another objective of the trip was to determine the proposed trade policies expected to affect the United States fisheries in connection with the establishment of the European Common Market. As yet, no information is available on the procedures that may be adopted for unifying markets, prices, and support policies for fishery products. As well as affecting United States trade directly, Common Market policies on tariffs may affect imports into the United States from countries outside the Common Market.

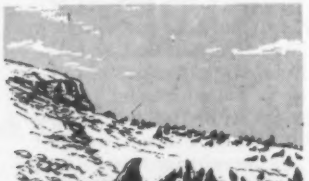
Fur Seals

TWO RUSSIAN SCIENTISTS STUDY HERDS AND FACILITIES ON PRIBILOF ISLANDS:

Two Russian fishery scientists and an interpreter arrived in September 1960 on St. Paul Island in the Pribilofs for a two-week study of the fur seal rookeries and the United States harvesting installations and management practices on the islands.

Two United States fishery scientists, both of the U. S. Bureau of Commercial Fisheries, at the same time went to Russia's Robben Island off the coast of Siberia for a similar study of the Russian fur-seal resource.

The exchange of scientific information and personnel is provided for in the fur seal convention signed in 1957 by the Soviet Union, Canada, Japan, and the United States. The convention provides for a six-year study of the northern fur seals as a means of obtaining information necessary for improved management of both the American and Asian herds



Although both Russian and American sealing operations had been completed for the year, during the scientists' visit the seal herds were starting their exodus for the high seas where they will intermingle to some extent during the winter months. In the spring the seals will return to their respective rookeries to breed and bear their young.

The United States scientists are Dr. Victor B. Scheffer, biologist from the Bureau's laboratory in Seattle and Eugene M. Maltzell, biologist-interpreter from Portland, Oreg. The Russian scientists are from the Soviet installations on Kamchatka. They are Timofei Mikhailovich Kantatnov, an engineer, and Petr Georgievich Nikulin, manager of the Kamchatka Laboratory on Oceanography. The translator is Leonid Vasilevich Kostin. Fukuzo Nagasaki, Tokyo biologist, and Sergei V. Dorofeev, Moscow biologist, have joined the Americans on Robben Island.

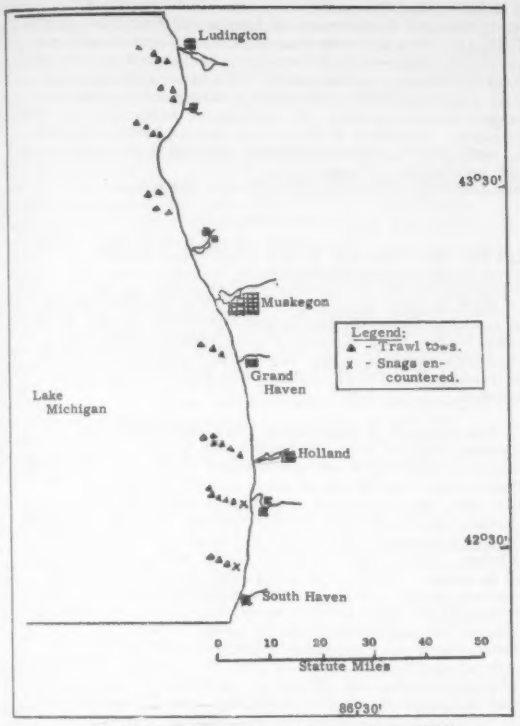
Great Lakes Fisheries Exploration and Gear Research

COMMERCIAL POTENTIAL OF UNDERUTILIZED FISH STOCKS IN LAKE MICHIGAN SURVEYED:

M/V "Art Swaer II" Exploratory Cruise 1: The first in the 1960 series of Lake Michigan exploratory cruises was completed August 17 when the U. S. Bureau of Commercial Fisheries chartered vessel Art Swaer II returned to Ludington, Mich. The primary objectives of the survey were to assess the commercial potential of underutilized fish stocks in the waters of Lake Michigan from Ludington to South Haven, Mich., and to determine the trawling characteristics of the lake bottom in that area.

During the seven-day cruise, 34 otter-trawl drags were completed in various depths between 10 and 38 fathoms using a standard, 50-foot Gulf of Mexico balloon-type fish trawl. Fishing efforts revealed considerable amounts of chubs (Coregonus sp.) to be available in the 15 - to 30-fathom depth range. The ten most productive drags were made between Ludington and Grand Haven. These ten catches consisted of from 233 to 577 pounds of chubs and averaged 360 pounds per 30-minute drag. These catches contained higher percentages of larger chubs which appeared to be in better physical condition than were fish taken in the more southerly areas.

Bottom conditions were found to be generally favorable for trawling at all but the shallowest depths examined. Depth recordings made at 10 fathoms consistently showed rough bottom conditions, and two of three attempts to drag at this depth resulted in severe damage to the net.

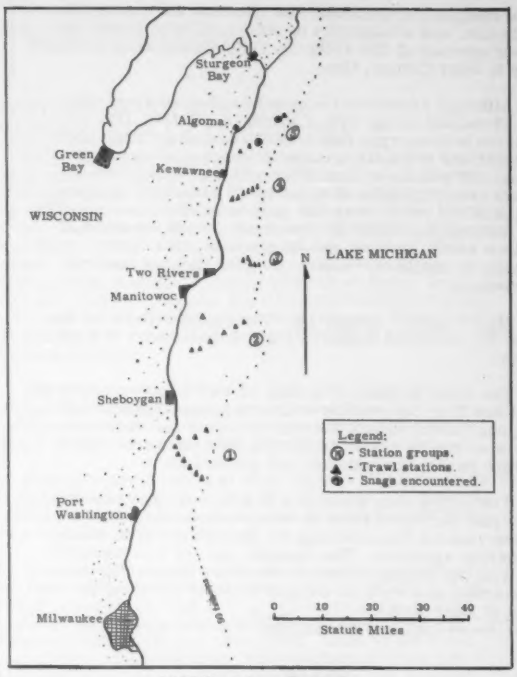


M/V Art Swaer Cruise 1 (August 10-17, 1960).

M/V "Kevinbren" Exploratory Cruise 2: The second Lake Michigan exploratory cruise was completed September 13, when the Bureau chartered vessel Kevinbren returned to Milwaukee, Wis. The Kevinbren is a Great Lakes gill-net tug that has been adapted to the trawl-method of fishing. The objectives of the 7-day cruise were to determine the commercial abundance and seasonal distribution of the various species of fish in the area between Sheboygan and Sturgeon Bay, Wis., and to learn the location of areas suitable for trawling.

Some 32 drags were completed in depths of 14 to 41 fathoms using a 50-foot (headrope), two-seam, Gulf of Mexico balloon-type trawl. Catches ranged from 55 to 705 pounds of mixed chubs, smelt, and alewives per half-hour drag. Best fishing results were obtained in 30-minute drags near Two Rivers in 20 to 36 fathoms, where 4 drags produced from 245 to 705 pounds; near Algoma in 25 to 32 fathoms, where 2 drags caught 304 and 428 pounds; and near Sheboygan in 30 to 32 fathoms, where 1 drag took 465 pounds. Alewives were present in about half of the catches, with the two largest amounts being 100 pounds in a 60-minute drag at 26-27 fathoms near Sheboygan and 30 pounds in a 30-minute drag at 20-21 fathoms near Kewanee. Smelt were found throughout the operational area, but in amounts of not more than 25 pounds per 30-minute drag.

Extensive echo-sounding operations revealed that the bottom topography varies greatly throughout the area covered. In the southern portion, the slope is



M/V Kevinbren Cruise 2.

rather gentle with only a few areas in the 15-25 fathom range too irregular for fishing operations. North of Two Rivers, the slope becomes steep, irregular, and terraced. Two drags in the northernmost station group resulted in minor gear damage.

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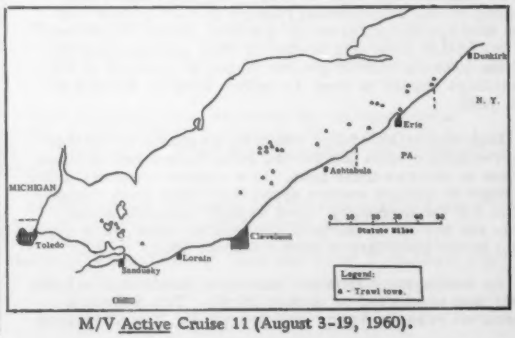
SEASONAL DISTRIBUTION STUDIES OF COMMERCIAL FISH STOCKS IN LAKE ERIE CONTINUED:

M/V "Active" Cruise 11: A 17-day trawling survey of the United States waters of Lake Erie, was completed on August 19, 1960, by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Active. The cruise



M/V Active Cruise 11 (August 3-19, 1960).

was designed to ascertain the seasonal abundance, distribution, and availability to otter trawls of smelt and other species of fish from the Ohio-Pennsylvania boundary to Port Clinton, Ohio.

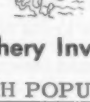
Although extensive recorded depth-soundings and 28 30-minute drags with a standard, 50-foot, Gulf of Mexico balloon-type fish trawl revealed no large concentrations of smelt, consistent catches (averaging about 200 pounds of smelt) were taken in the central basin area at depths of about 10-13 fathoms. Largest catch of the cruise was 400 pounds of smelt taken in 12-13 fathoms northeast of Cleveland. Small amounts of yellow perch, burbot, and sheepshead were taken--mostly in shallower water. No gear damage was experienced.

M/V "Active" Cruise 12: The Active left Erie, August 29, for three weeks of trawl explorations in Lake Erie.

The main purpose of cruise 12 was to cover as much of Lake Erie as possible with continuous depth-sounding and fishing effort in order to locate and determine the availability to trawls of such fish stocks as smelt, yellow perch, sheepshead, and gizzard shad.

The Active was scheduled to take part in a two-day synoptic survey of Lake Erie in cooperation with 12 other vessels representing the Bureau and five other fisheries agencies. The synoptic survey was concerned with the ecological characteristics (especially the horizontal and vertical oxygen content) affecting the fish of Lake Erie.

Note: Also see Commercial Fisheries Review, Sept. 1960 p. 20.



Great Lakes Fishery Investigations

LAKE ERIE FISH POPULATION SURVEY:

M/V "George L." August 1960: Intensive trawling operations (108, 10-minute tows) by the U. S. Bureau of Commercial Fisheries research vessel George L. in the East Harbor and Bono areas in early August revealed more clearly that young-of-the-year fish generally were scarcer than in 1959. Most notable were the reduced catches of yellow perch and yellow pike. Only 5 young-of-the-year yellow pike were captured.

Yellow pike, hatched in 1959, now average 13 inches long (the legal length in Ohio) and range from about 10 to 15 inches long. The average yearling yellow pike landed by the commercial fishery is 13.4 inches and the average weight is about $\frac{3}{4}$ pound. About 95 percent of the yellow pike now landed in Ohio are yearling fish. At the present rate of growth, about 90 percent of the yearlings should be over 13 inches long by the end of the year.

High mortality of fish taken by trap nets in the Huron-Vermilion area has forced some fishermen in those areas to remove their nets. Low oxygen concentrations at night in bottom waters apparently have been responsible for the mortality. Low oxygen concentrations near the bottom in parts of the central basin were common in the summers of both 1959 and 1960.

An interagency synoptic survey of conditions in Lake Erie was conducted on August 30-31. The Bureau's research vessels Active and George L., Ohio Divisions of Wildlife and Shore Erosion vessels SP-1, SP-3, SE-1, Ontario Department of Lands and Forests vessel Keenosay, Pennsylvania Game and Fish Commission vessel Perca, University of Toronto vessel Dauphine, and Ohio State University participated in the lake-wide survey. Data were collected on turbidity, water temperatures, oxygen concentrations, pH, alkalinity, water quality, and plankton. Analyses of these data should better describe the nature of the environmental conditions that influence fish production in Lake Erie.

Note: Also see Commercial Fisheries Review, Oct. 1960 p. 30.

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LAKE MICHIGAN FISH POPULATION SURVEY CONTINUED:

M/V "Cisco" Cruise 6: The fish population survey in southern Lake Michigan was continued (August 9-23, 1960) by the U. S. Bureau of Commercial Fisheries research vessel Cisco. Tows with a commercial-type, 52-foot balloon trawl continued to yield rather small catches.

The tows off Grand Haven were approximately straight west of port, except for the 4-, 7-, and 10-fathom drags which were 4-6 miles south. The tows off Racine were northeast of port, and off Milwaukee, the 15-, 20-, and 25-fathom drags were about 12 miles north. The remainder were northeast of port. Bloaters (Leucichthys hoyi) made up 98-100 percent of the chub catches. Fish caught with the chubs were usually limited to small numbers of smelt and slimy sculpins in shallow water, and deep-water sculpins in deeper tows. In the following instances, however, the catch composition varied markedly from the usual: 4 fathoms off Grand Haven--16 pounds of alewives, and small numbers of spottail shiners and emerald shiners; 7 fathoms off Grand Haven--69 pounds of alewives, 30 pounds of spot-tail shiners, and 20 pounds of carp (2 individuals); 10 fathoms off Grand Haven (average of 3 tows)--54 pounds of alewives, 19 pounds of yellow perch, and 21 pounds of whitefish (9 of 39 whitefish in the 3 tows were of legal size); 50 fathoms off Grand Haven--130 pounds of deep-water sculpins.

Gangs of nylon gill nets (50 feet each of $1\frac{1}{2}$- and $1\frac{1}{2}$-inch, 200 feet of 2-inch, and 300 feet each of $2\frac{3}{8}$-, $2\frac{1}{2}$-, $2\frac{3}{4}$-, 3-, $3\frac{1}{2}$-, and 4-inch mesh) were set overnight at 25 and 50 fathoms off Grand Haven and off Racine. Catches were light.

A gang of nylon gill nets (minus the 100 feet of 2-inch mesh) set for 5 nights at 80 fathoms off Racine took 1,670 chubs. It appeared that the smaller meshes "loaded up" and practically quit fishing early in the set. Nearly all the fish in the smaller meshes were very soft. They must have been in the net for several days. Most of the chubs in this set were difficult to identify, since they were intermediate in appearance between typical L. hoyi and L. kiyi. There were, however, several quite typical L. kiyi, but not nearly so many as were taken in similar sets in the same area in 1954.

Linen gill nets set off Grand Haven, compared with identical gangs set at the same time of year in 1954, took considerably fewer of all chub species at 25 fathoms, and about the same number of bloaters but fewer of other chub species at 50 fathoms. L. kiyi continued to be especially scarce in sets made this cruise. Nothing of significance other than chubs was taken in the gill nets.

Hydrographic collections and observations were made at 25-fathom stations off Grand Haven and Racine and

at a 70-fathom station in midlake between Grand Haven and Racine. Surface water temperatures were very uniform along the transect made across the lake from Grand Haven to Racine, ranging mostly from about 69° F. on the east side to about 67° F. on the west side. Extremes recorded during the cruise were 64.2° F. and 73.4° F.

M/V "Cisco" Cruise 7: Light chub catches were made (August 30-September 12, 1960) in gangs of nylon gill nets (50 feet each of 1½- and 1¾-inch, 200 feet of 2-inch, and 300 feet each of 2⅜-, 2½-, 2¾-, 3-, 3½-, and 4-inch mesh) set overnight at 25 and 50 fathoms off Grand Haven, Mich., and off St. Joseph, Mich.

The catch at 50 fathoms off Grand Haven is an average of 4 overnight sets lifted on successive days. These 4 sets, as well as single 2-, 3-, and 4-night sets were made to study variations in catches on successive nights, and differences in catches in nets set for varying lengths of time. The 1-night sets took 277, 217, 151, and 169 chubs, respectively; the 2-, 3-, and 4-night sets took 438, 615, and 760 chubs, respectively. The percentage increase in catch with increased duration of set was greater than during experiments in previous cruises when catches were larger and heavily fishing meshes "loaded up."

Catches were also light in linen gill nets set for 5 nights at 25 fathoms (255 feet each of 2⅜-, 2½-, 2⅝-, 2¾-, and 3-inch mesh) and at 50 fathoms (510 feet of each of the above mesh sizes) off Grand Haven. At 25 fathoms there were 215 Leucichthys hoyi, 1 L. alpenae, and 4 lake herring; at 50 fathoms, 193 L. hoyi, 5 L. alpenae, 4 L. reighardi, 12 L. kiyi, and 2 L. zenithicus. In identical sets made in 1954 at the same time of year, catches of all species were considerably larger at 25 fathoms; at 50 fathoms there were appreciably fewer L. hoyi in 1954, but about the same numbers of the other species. A few deep-water sculpins were all that were taken with the chubs and herring in the gill nets.

A 52-foot commercial-type balloon trawl was fished off Grand Haven and St. Joseph. All tows off St. Joseph were approximately due west of port as were all tows off Grand Haven except those at 7, 10, and 12 fathoms, which were 4 to 6 miles south of port. The trawl catches were generally smaller than during pervious cruises. The catches at intermediate depths (15° to 40° F.) were exclusively chubs except for a few deep-water sculpins and slimy sculpins and an occasional yellow perch or smelt. At 45 and 50 fathoms off Grand Haven, however, 136 and 202 pounds, respectively, of deep-water sculpins were taken; and in the 7-, 10-, and 12-fathom drags off Grand Haven, yellow perch, alewives, and smelt were common (237 pounds of perch at 7 fathoms, 52 pounds of alewives at 10 fathoms, 18 pounds of smelt at 12 fathoms). At 7 fathoms there were also 25 pounds of spottail shiners and a few longnose suckers. Usually the chubs in the catches were 95 to 100 percent bloaters, but in the 20-fathom tow off St. Joseph, L. zenithicus and L. alpenae made up about 20 percent of the take.

Hydrographic collections and observations were made at regular 25-fathom stations off Grand Haven and St. Joseph. Surface-water temperatures, mostly about 75° F., were the highest observed this year. The maximum recorded in the open lake was 77.4° F. Near the end of the cruise, however, strong northerly winds set up a stiff current, and a resultant upwelling dropped surface-water temperatures to as low as 54.6° F. near the shore off Grand Haven. The area of upwelling extended out from shore about 3 miles.

Note: Also see Commercial Fisheries Review, Oct. 1960 p. 30.

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WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 5: Studies during this cruise were conducted (August 8-17, 1960) by the U. S. Bureau of Commercial Fisheries research vessel Siscowet at Isle Royale, Mich., Thunder Bay, Ont., and Grand Marais, Minn. The Isle Royale stations were located in Rainbow Cove, north of Thompson's Island, south of Mott Island, northeast of Gull Island, southeast of Canoe Rocks, Todd Harbor, and east of Rock of Ages. In Thunder Bay the stations were located between Pie and Welcome Islands, and just south of Thunder Cape. At Grand Marais the station was just south of Grand Marais Harbor.

The objectives of cruise 5 were to collect various forms of chubs (Leucichthys sp.) and lake trout morphological studies, and to compare the relative abundance of the lake trout with previous years' catches.

Gill nets were fished at each station. The gangs were mostly small-mesh nets (1-, 2-, 2¼-, 2½-, 3-, 3½-inch mesh). One 6-inch-mesh net was attached to the gang in search of large trout.

Good collections of chubs were made at nearly all stations in the Isle Royale area. A total of 451 L. hoyi, 216 L. zenithicus, and 116 L. kiyi were taken. The catch of small lake trout (409) was greater than the catch of 1959 (362) and 1958 (208). Most of the trout were 12 to 16 inches long. Only two large trout (siscowets) were captured and only one fish was scarred by lamprey.

The state of gonads from the Isle Royale chubs suggested that L. kiyi is the first to spawn in the fall; L. zenithicus spawns possibly in late fall or early winter; and L. hoyi spawns in late winter or early spring. The appearance of L. zenithicus at Isle Royale was similar to that of L. reighardi in the eastern part of Lake Superior. The L. reighardi have been observed, however, to spawn in the spring. Morphological studies must be made of these two species to seek means of separation.

The catches in the Thunder Bay region are believed to have included L. reighardi dymondi, a subspecies reported to exist along the north shore of Lake Superior. Positive identification was not made in the field, but preliminary examination of the fish strongly suggested its identity as L. dymondi.

The catch at Grand Marais, Minn., consisted mainly of bloaters (L. hoyi). The sexual development of these fish agreed very closely with that of bloaters taken at Isle Royale and Thunder Bay.

Fish collected from all areas for morphological studies totaled 204 L. zenithicus, 212 L. hoyi, 95 L. kiyi, 79 lake trout, 57 unidentified chubs, and 21 lake herring.

Surface temperatures at Isle Royale ranged from 55.7° F. northeast of Gull Island to 62.0° F. south of Mott Island. At Thunder Bay the surface temperature was 54.5° F. at Thunder Cape and 61.0° F. between Pie

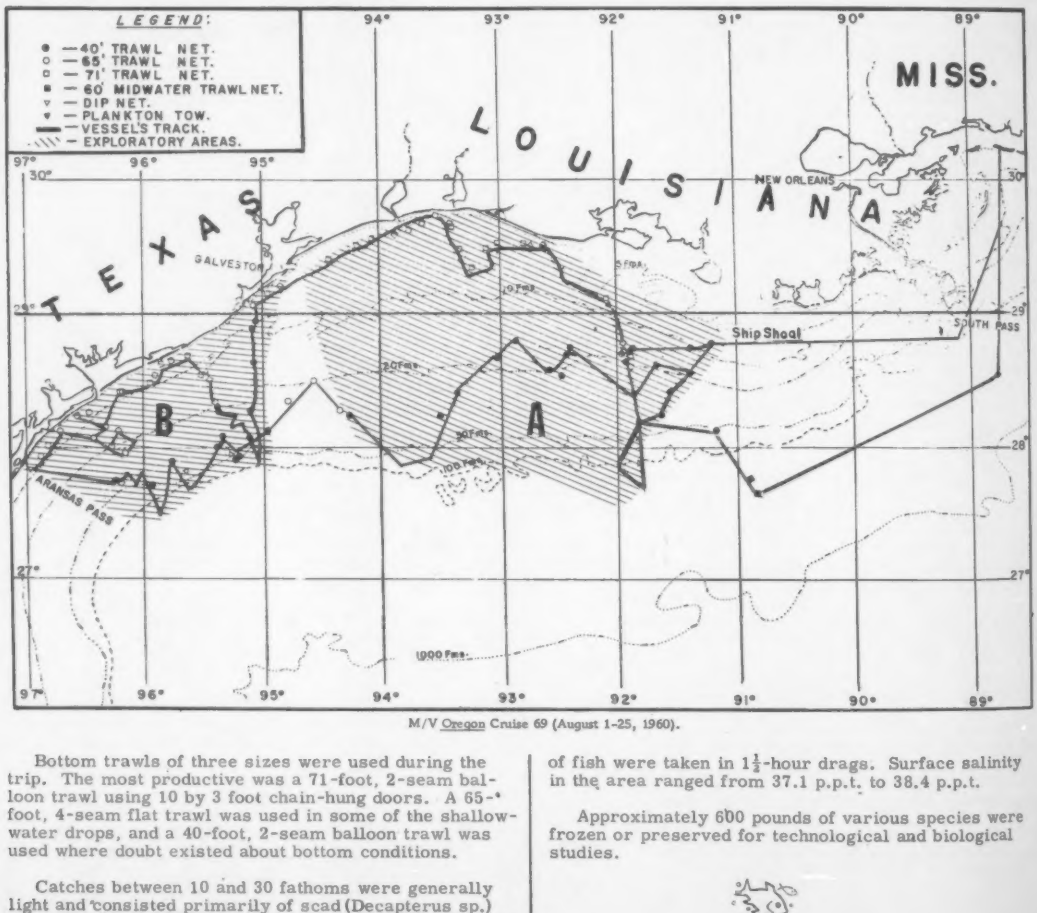
and Welcome Islands. The surface temperature at Grand Marais, Minn., was 56.4° F.

Note: Also see Commercial Fisheries Review, Oct. 1960 p. 32.

Gulf Exploratory Fishery Program

EXPLORATORY FISHING FOR INDUSTRIAL FISH:

M/V "Oregon" Cruise 69: A 25-day exploratory survey (August 1-25, 1960) of industrial fish concentrations was made by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon between Ship Shoal, La., and Aransas Pass, Tex. A total of 81 bottom trawling stations, 3 midwater trawling stations, 8 dip-net stations, and 1 plankton station was made. A total of 20 surface-salinity readings was taken over the trawling areas.



M/V Oregon Cruise 69 (August 1-25, 1960).

Bottom trawls of three sizes were used during the trip. The most productive was a 71-foot, 2-seam balloon trawl using 10 by 3 foot chain-hung doors. A 65-foot, 4-seam flat trawl was used in some of the shallow-water drops, and a 40-foot, 2-seam balloon trawl was used where doubt existed about bottom conditions.

Catches between 10 and 30 fathoms were generally light and consisted primarily of scad (Decapterus sp.) and porgy (Stenotomus sp.). Bottom trawling conditions beyond 30 fathoms were uniformly poor and transects out to 100 fathoms showed untrawlable bottom for the available gear. Midwater schools of fish were not encountered during any phase of the trip.

The best results were obtained between Ship Shoal and Galveston in 3 to 10 fathoms. The largest catch in this area was 4,200 pounds in a 2-hour drag. One drag made in 17 fathoms produced 1,500 pounds of round herring (Etrumeus sp.) and another produced 1,000 pounds of butterfish (Poronotus sp.).

One item of interest was the proportion of menhaden taken by bottom trawls. There were two species; Brevoortia patronus averaging 10-11 inches and B. gunteri averaging 6-7 inches. Surface salinity in the area ranged from 27.7 p.p.t. to 36.0 p.p.t.

Between Galveston and Aransas Pass, Tex., the most productive depths were also 3 to 10 fathoms. The best drags were made off Pass Cavallo where 1,500 pounds of fish were taken in 1½-hour drags. Surface salinity in the area ranged from 37.1 p.p.t. to 38.4 p.p.t.

Approximately 600 pounds of various species were frozen or preserved for technological and biological studies.

Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex., Biological Laboratory of the U. S. Bureau of Commercial Fisheries during July-September 1960:

SHRIMP FISHERY INVESTIGATIONS: Pink Shrimp Growth: Investigation of the growth of pink shrimp during early juvenile stages was initiated in early August. Approximately 11,000 specimens taken from an arm of Biscayne Bay were graded to sizes ranging from 9 to 14 mm. (carapace length), marked by "feeding" them trypan red stain, and released. Bait shrimp fishermen and dealers were alerted to recover the marked shrimp, but none have been recaptured to date. A sample of 100 shrimp so marked is being held alive to check the stain's retentivity. Indications are that despite no recoveries, the marking phase of the experiment was a success.

Mortality of Marked Shrimp: The third phase of an experiment designed to evaluate the effects of marking as measured by the comparative survival of shrimp marked by various methods was completed this quarter. As in the two previous phases, stained and unmarked (control) shrimp experienced approximately equivalent survival. Specimens tagged with Petersen discs suffered appreciably greater mortality.

Larvae Studies: Efforts to rear penaeid larvae from eggs spawned by laboratory-held females were continued. To date no gravid white shrimp, Penaeus setiferus, with spermatophores attached have been taken alive. We are, therefore, investigating the feasibility of artificial fertilization, mixing eggs taken from gravid females with sperm dissected from intact spermatophores. Attempts to obtain fertile eggs by this means have thus far been unsuccessful.

Seabobs, Xiphopeneus kroyeri, spawned (or, in some cases, aborted) in our aquaria several times during the quarter. Many of the eggs underwent considerable development before succumbing to predation by unidentified microzoans.

Several experiments aimed at improving techniques for rearing larvae were initiated. These involved varying the ratio of medium volume to organism; varying the rate with which the holding medium is agitated; controlling micro-organism populations with antibiotic and other chemical solutions; and rearing Palaemonetes (Caridea) larvae to draw inferences as to food requirements needed for optimum survival and growth of late larval stages in Penaeidea.

Commercial shrimp post-larvae are being reared to sizes at which species determination using adult characteristics can be made. This will validate the use of existing keys to identify post-larval Penaeidae occurring in the Galveston area.

Routine collection and tabulation of commercial production and effort satistics for Galveston Bay's bait shrimp fishery continued as they have since mid-1959. These statistics will be used in conjunction with comparable data obtained from the adjacent offshore fishery in attempts to relate (quantitatively) progeny occupying inshore "nursery" areas and their progenitors inhabiting offshore areas.

Indicative of the seasonal trend, bait production for the quarter showed a marked increase over that of the previous quarter. Production for July was slightly lower than that for the same period a year ago while August's production exhibited almost a threefold increase. Greater utilization of shrimp for bait during the current year reflects a slight upward trend in local sport fishing activity and the reproduction of larger-than-normal broods of both brown and white shrimp. Comparable statistics are given in the following table:

Month	1960				1959			
	Catch (pounds)	Composition (%)		Lbs. Per Hrs. Effort	Catch (pounds)	Composition (%)		Lbs. Per Hrs. Effort
		Brown	White			Brown	White	
June	204,200	99	1	106.6	61,200	Data unavailable		5.5
July	149,600	63	37	42.9	166,000	40	60	54.4
Aug.	218,600	19	81	95.2	82,000	9	91	38.1
Sept.	Data not yet available				67,700	20	80	31.5

INDUSTRIAL FISHERY STUDIES: Considerable progress has been made in compiling and evaluating data collected during the past year on the spawning of groundfishes, particularly on the dominant species. Length-weight data were compiled and some sample curves worked out.

Croaker, spot, and white trout constituted 62 percent of the total catches by weight in July and 69 percent in August. In July and August 1959 these three species were 69 percent and 64 percent, respectively. Data for September showed the three dominant species constituted about 69 percent of the total catch by weight. Eight additional species made up the bulk of the catch and miscellaneous species constituted 7 percent of the catch by weight for July, 6 percent in August, and 9 percent in September, all of which was slightly less than the same period in 1959. The average number of species for July was 13, 10 for August, and 16 for September. New species identified were as follows: Euthynnus allitteratus, Sphyraena barracuda, Monocanthus ciliatus, Ophidion holbrooki, Epinephelus niveatus, E. flavolimbatus, Lopholatilus chamaelcontion, Spheroides spengerli, and an, as yet, unidentified flat fish. Our check list of species observed in industrial landings in the Pascagoula area now totals 181 vertebrates of 77 families and 32 species of invertebrates of 26 families. An unusual catch was made by the petfood trawler Deacon's Daughter when she took a 12-foot female tiger shark, Galeocerdo cuvier, estimated at over 600 pounds, off Horn Island in 4 fathoms of water.

Forty landings were sampled in July from a total of 1,724,943 pounds, 35 in August from 1,048,210 pounds and 30 in September. Fishing was disrupted in the middle of September by hurricane "Ethel." The average depth fished in July was 5 fathoms, in August it was 4.8 fathoms, and September 5 fathoms. Many of the large refrigerated vessels continued fishing west of the Mississippi River Delta well into August. During the same period of 1959, no vessels from the Pascagoula fleet were fishing in the area west of the river. By early September the entire fleet was fishing generally from just east of the Mobile ship channel to the Horn Island area. Catches have been generally good, and the fleet has been limited mainly by the amount of fish the plants could utilize. The vessels were averaging about one trip a week throughout the quarter. Two local plants ceased handling finfish during the shrimp season, but one had resumed canning petfood by the middle of September.

EFFECT OF PESTICIDES ON MARINE ORGANISMS: Determination of median tolerance limits for various insecticides was continued this quarter with most of the emphasis on brown shrimp (Penaeus aztecus) which were abundant locally from May through August. Since August, studies have been shifted to white shrimp (P. setiferus), blue crabs (Callinectes sapidus), pinfish

(Lagodon rhomboides), golden croaker (Micropogon undulatus), and spot (Leiostomus xanthurus). New chemicals tested this quarter include TDE (DDD), Methoxychlor (DMDT), Sabane, Rotenone, and Nemagon, all of which were less toxic to shrimp than most of the chlorinated hydrocarbons tested, such as Dieldrin, Heptachlor, DDT, Endrin, BHC, and Aldrin. Thus far, studies have been confined mainly to the chlorinated hydrocarbon group of pesticides. Work with the organic phosphates is pending the installation of a fume hood and acquisition of other safety equipment.

Note: See Commercial Fisheries Review, February 1960 p. 36.

Hawaii

COMMERCIAL FISHERY LANDINGS, JULY 1959-JUNE 1960:

Commercial fisheries landings of sea and pond fish in the State of Hawaii during the fiscal year July 1959-June 1960 amounted to 14.3 million pounds, valued at $3.0 million ex-vessel, according to the Hawaiian Division of Fish and Game. Landings of tuna made up 84.6 percent of the quantity and 67.6 percent of the value of all fishery landings. Skipjack tuna was the most important species landed.

The Island of Oahu accounted for close to 10.9 million pounds (valued at about $2.3 million), or about 76.7 percent of the quantity and 76.4 percent of the total value of all landings of sea and pond fish and shellfish in the fiscal year ending June 30, 1960. The Island of Hawaii was the second most important center of Hawaii's fishing industry and accounted for 15.3 percent of both the total landings and their value. Landings of commercial fish and shellfish in the Islands of Maui, Lanai, Molokai, and Kauai were quite light.

Table 1 - Hawaiian Commercial Fishery Landings and Ex-Vessel Value, July 1959-June 1960

Species		Quantity	Value
English Name	Hawaiian Name	1,000 Lbs.	US$ 1,000
Ocean Catch:			
Amberjack	Kahala	75	22
Big-eyed scad	Akule	245	174
Dolphin	Mahimahi	102	52
Goatfish	Weke-ula Weke Moano Kumu	126	74
Crevalles	Ulua Omilu	86	39
Mackerel	Opelu	208	82
Snappers:			
Gray	Uku	44	21
Pink	Ōpakapaka Kalekale	108	57
Red	Ulaula koae, ehu	60	53
Swordfishes, sailfishes spearfishes, & marlins	A'u & A'u lepe	693	186
Tuna & tunalike fish:			
Albacore	Ahipalaha	11	2
Big-eyed & bluefin		1,403	598
Yellowfin	Ahi	454	165
Skipjack	Aku	10,196	1,259
Bonito	Kawakawa	5	1
Shellfish:			
Crabs	Kona, Papai, Samoan	11	6
Limpet	Opihi	18	8
Lobster, spiny	Ula	13	8
Octopus	Hee	5	3
Squid	Muhee	5	2
Other fish & shellfish	-	316	125
Total Ocean Catch		14,184	2,937
Pond Catch:			
Clams	Olepe	2	1
Crabs	Kuakonu, Papai	6	3
Milkfish	Awa	16	6
Mullet	Amaama	47	40
Other species	-	13	7
Total Pond Catch		84	57
Grand Total		14,268	2,994

Table 2 - Hawaiian Commercial Fishery Landings by Islands, July 1959-June 1960

Island	Sea Catch		Pond Catch		Total Catch	
	Quantity	Value	Quantity	Value	Quantity	Value
	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
Hawaii	2,184	458	2	1	2,186	459
Maui	891	139	-	-	891	139
Lahai	13	5	-	-	13	5
Molukai	13	7	8	5	21	12
Oahu	10,863	2,235	74	51	10,937	2,286
Kauai	220	93	-	-	220	93
Total	14,184	2,937	84	57	14,286	2,994

Landings of commercial fish and shellfish in the Hawaiian Islands during July 1959-June 1960 by months were heaviest during the summer and early fall months. The July-October 1959 period accounted for 56.2 percent of the total landings. July 1959 alone accounted for close to 19.2 percent of the total landings. Landings of commercial fish and shellfish in the Hawaiian Islands are dominated by the seasonal availability of skipjack tuna. The fishery for tuna is the most important fishery in the Islands.

Table 3 - Hawaiian Commercial Fishery Landings by Months, July 1959-June 1960

Period	Sea Catch		Pond Catch		Total Catch	
	Quantity	Value	Quantity	Value	Quantity	Value
1959	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000	1,000 Lbs.	$1,000
July	2,739	391	6	3	2,745	394
Aug.	2,101	323	6	4	2,107	327
Sept.	1,668	287	9	6	1,677	293
Oct.	1,480	278	6	3	1,486	281
Nov.	953	203	7	5	960	208
Dec.	558	241	17	13	575	254
1960						
Jan.	441	141	12	10	453	151
Feb.	448	167	6	5	454	172
March	690	219	3	1	693	220
Apr.	816	220	4	3	820	223
May	1,180	229	5	3	1,185	232
June	1,110	238	3	1	1,113	239
Total	14,184	2,937	84	57	14,268	2,994

Note: See Commercial Fisheries Review, May 1960, p. 25.

Industrial Fish as Food for Ranch Mink

The United States ranch-mink industry in 1958 was composed of approximately 6.5 million animals, including breeders and pelters. It is estimated that the 1960 herd size will increase by 10-15 percent to over 7.0 million mink. Three-fourths of the mink production is concentrated in the Great Lakes states and adjacent Midwest states, with Wisconsin producing almost four times as many animals as any other state. Western and Pacific Northwest states account for 15 percent of the production, with most of the remaining 10 percent accounted for by the New England and Middle Atlantic States.

Fish, including the nonmarketable species for human consumption and scrap fish from fish-processing plants, provide an economical and highly nutritious source of feed for ranch mink. Mink ranchers can be expected to use an estimated 256 million pounds of fresh and frozen fish and fish scrap in 1960.

Table 1 - Estimated Potential Use of Fish by Mink Ranchers

Area	Average Level of Fish in Ration	Estimated Consumption of Fish
	%	Million Lbs.
Great Lakes & Midwest States	25	164
West & Pacific Northwest	50	66
Atlantic Coast	30	26
Total		256

This is based on an average total feed consumption of 125 pounds per animal annually. In addition, a limited amount of fish meal is used--some in the cereal portion of the rations and a lesser amount as a replacement for fresh fish. An estimated 2.5 million pounds of fish meal will be utilized in mink rations during 1960.

In the Midwest between 40 million and 50 million pounds of the fish used will be of freshwater origin, composed of sheepshead, carp, smelt, bloater chubs, tullibees, lake herring, alewives, yellow perch and pickerel fillet scrap, and miscellaneous species. Salt-water fish used by Midwest ranchers will include whole whiting and hake, cod and flounder scrap, miscellaneous species from the Atlantic Coast; croakers and a conglomerate of species from the Gulf of Mexico; and sole and rockfish scrap from the Pacific Northwest states. Western ranchers utilize whole fish composed of various species of sole and rockfish not used for human consumption, either because of their small size or limited markets, and a few miscellaneous species. Waste from West Coast fillet-processing industries is extensively used for mink feed. Some croakers are used by Colorado and Utah ranchers. Atlantic Coast ranchers make use of whiting and hake; cod, flounder, and other fish-processing scrap; and whatever species of whole fish are available to them locally.

Most of the fish is distributed to ranchers through feed dealers and mink ranchers' co-ops. This is generally true throughout the United States. Ranchers who have the freezer capacity, do take advantage of local sources of fish. The trend in the Midwest is toward a ready-mixed complete ration, either frozen and delivered to ranchers by feed dealers, or delivered ready to feed from co-ops.

The price the rancher pays for fish frozen and delivered to the ranch averages about $4.50 a hundred pounds. Some ranchers may pay as much as $6.00 for preferred species, or as little as $2.00 for thiaminase fish and fish scrap. Costs of freezing, packaging, handling, transportation, and brokerage fees average about $2.25 a hundred pounds. There is, of course, considerable variation in this cost, depending on the circumstances and efficiency of operations. Fish from the Atlantic Coast and the Gulf can be delivered frozen into Chicago at $3.50-$4.00 a hundred pounds.

Fish produced for mink feed must be of a quality almost equivalent to fish used for human consumption. This point cannot be overemphasized. Fish should be iced aboard the vessels and in the plants until frozen. The fish should be packaged in 50-pound containers, either boxes or bags, of no greater than six-inch thickness and quick-frozen, preferably at -20° F. Cold storage should be at -5° F. Fish which contain the thiaminase factor should not be included with other fish unless all the fish are to be cooked or treated to destroy the enzyme.

The mink-food market for fish can be expected to increase, particularly if efforts are maintained to keep the quality of fish high. This increase can be accelerated through research into methods of making greater use of present abundant sources of thiaminase fish, through research into ways to reduce feed costs and increase profits, and through increased use of fish in mink rations.

--Walter G. Jones,
Fishery Marketing Specialist,
Branch of Marketing,
Division of Industrial Research,
U. S. Bureau of Commercial Fisheries,
Ann Arbor, Mich.

North Atlantic Fisheries Investigations

DISTRIBUTION AND ABUNDANCE OF GROUNDFISH IN THE INSHORE NURSERY AREAS SURVEYED:

M/V "Capt. Bill III": A 5-day cruise (the second of a series), by the chartered fishing vessel Capt. Bill III was made late in August by fishery biologists of the U. S. Bureau of Commercial Fisheries to determine the distribution and abundance of bottom fish inhabiting inshore waters, especially small haddock which might be taken by unregulated boats using small mesh trawl nets. The survey was made in the vicinity of Cape Cod and the Massachusetts Bay area between Cape Ann and the Isles of Shoals.

Thirty-two different kinds of fish were taken in the 30 tows. Haddock and cod were the most abundant of the food fish, and dogfish far outnumbered the noncommercial fish taken. Several schools of tuna were sighted in various parts of Cape Cod Bay during the 5-day period. The haddock data will be used in a study of the extent of nursery grounds at this season of the year.

A special collection of dogfish was made for the University of Cambridge, England.

Note: Also see Commercial Fisheries Review, Sept. 1960 p. 25.

North Pacific Exploratory Fishery Program

GOOD TRAWLING BOTTOM FOUND OFF BRITISH COLUMBIA:

M/V "John N. Cobb" Cruise 47: A relatively large clear area of about 60 square miles of trawlable ocean-bottom was found northwest of Triangle Island by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb. Catches of 3,000 pounds of rockfish and from 200 to 700 pounds of Dover sole per hour tow were commonly made in the area at depths from 75-115 fathoms. Good catches of rock sole and true cod were obtained at depths from 50-75 fathoms. The vessel returned to Seattle September 9, 1960, completing an 8-week exploratory bottom-trawling cruise off British Columbia.

Several small patches of clear dragging bottom were found south of the Scott Islands

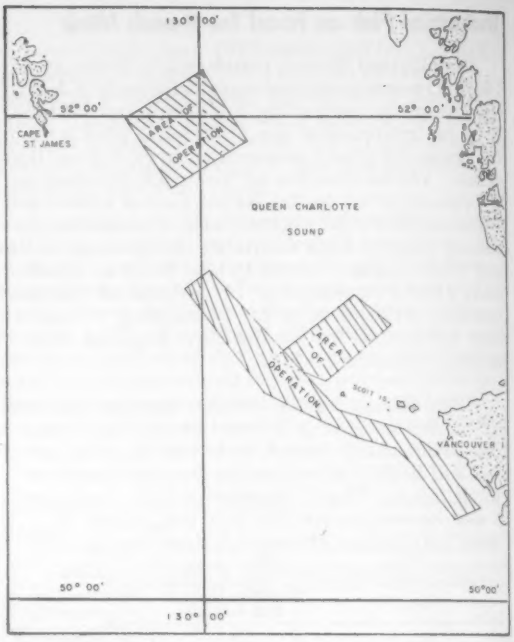


Fig 1 - M/V John N. Cobb Cruise 47 (July 18-September 9, 1960).

where the commercial trawl fleet had previously been unable to fish. Good catches of rockfish and Dover sole were taken in that area.

Only a small patch of clear bottom was found in the limited time available for surveying the Queen Charlotte Sound region. As precise radio bearings are difficult to obtain in that area and it is too far from shore to obtain radar fixes from coastal promontories, commercial trawlers would probably not be able to position themselves accurately enough to utilize this restricted ground. Future work to extend the survey thus seems advisable for that region.

Soundings shown on charts for the areas investigated northwest of Triangle Island and in Queen Charlotte Sound were scanty and often in error. Special efforts were therefore made during the cruise to compile extensive and accurate soundings. The soundings will be summarized and distributed to the trawl fleet to facilitate their fishing operations.

Locations of the delineated clear areas and catches obtained were communicated to

the trawling fleet directly, and through their association representatives as soon as the survey work was complete in each area.

The procedure used to survey the area was as follows: (1) Sounding transects, using a high resolution research model echo-sounder, were made approximately two miles apart and at right angles to each other. The character of the bottom with respect to hardness was plotted during the sounding transects as were the definitely untrawlable stretches. (2) The promising sections within the soft bottom areas were then surveyed using a snag cable 280 feet long between standard 8-foot by 4-foot otter doors. (3) On snag cable tows coming clear a standard 400-mesh eastern otter trawl was towed to evaluate the species and magnitude of fish populations present.

A total of 129 stations including sounding transects, snag cable tows, and otter trawl tows were made during the cruise.

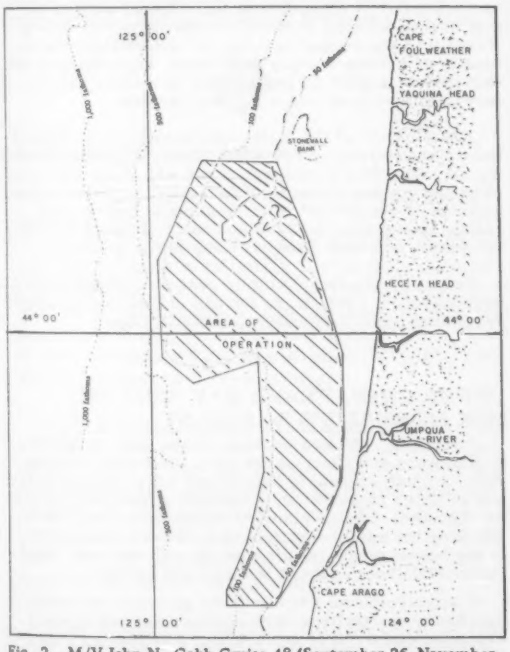


Fig. 2 - M/V John N. Cobb Cruise 48 (September 26-November 5, 1960).

M/V "John N. Cobb" Cruise 48: The John N. Cobb departed Seattle on September 26, 1960, for 6 weeks of exploratory shrimp fishing between Coos Bay and Newport, Oreg., in cooperation with the Oregon Fish Commission. Biologists from the Fish Commission were aboard during the entire cruise and participated in all phases of the operation. The primary purpose of the cruise was to delineate commercial shrimp grounds.

Oregon

HATCHERY-PRODUCED SALMON SUPPLEMENT NATURAL SPAWNING:

Salmon and steelhead releases from 16 Oregon Fish Commission hatcheries for the first six months of 1960 totaled more than 42 million fingerlings. The releases were made, according to the Director of Fish Culture, as a supplement to natural fish stocks. The hatcheries are located on key rivers throughout the state.

Coastal rivers received 1,755,000 fingerlings of which 105,000 were steelhead, 309,000 fall chinook, 226,000 chums, and 1,114,000 silver salmon.

The main Columbia River and small tributaries received 26,000 spring chinook, 31,696,000 fall chinook, 103,000 steelhead, 1,230,000 chums, and 2,656,000 silver for a total of 35,711,000 fish.

Willamette River was stocked with 4,663,000 fingerlings. Contributions to that area were 3,935,000 spring chinook, 201,000 fall chinook, 528,000 steelhead, and 3,770,000 silvers.

"All of the silvers, spring chinook, and steelhead were released as yearlings from 4 to 6 inches in length," the Director of Fish Culture stated. "Chums were released as unfed fry and fall chinook were fed up to 90 days to correspond with natural migration habits of these species. The silver salmon yearlings included in the stocking program were from the 1958 brood and will return as adults to the sport and commercial fisheries in the summer and fall of 1961.

"The chinook fingerlings, also the 1958 brood, will return to the rivers in 1962 and 1963. Steelhead normally spend one or two years in fresh water and two or more years in the ocean, and will return during the winters of 1962 and 1963."

A new hatchery diet in pellet form was fed to all 1958 brood silvers and 449,000 of the spring chinook. Healthy, well-fed fish

are the result of feeding the new moist pellet developed by the Oregon Fish Commission and the Astoria Seafoods Laboratory of Oregon State College. The custom-made pellets contain tuna and salmon viscera and other fish products combined with meals and vitamin supplements to form the complete fish diet in one easy-to-handle form. An estimated 500,000-600,000 pounds of pellets will be fed during fiscal 1961 to fish in the hatcheries now.

Oysters

LONG ISLAND SOUND OBSERVATIONS ON SPAWNING AND SETTING:

As of August 31, 1960: During the week preceding August 31, 1960, the bottom water temperature of the oyster-producing section of Long Island Sound ranged between 70.5° F. and 74.5° F. The water was relatively clear, showing no dinoflagellate blooms.

Since August 23, the number of mature oyster larvae per sample remained relatively constant at one station, but showed a pronounced increase at another station. However, at still another station larvae were still uncommon. It may be of significance, nevertheless, that, although at the one station where the number of oyster larvae remained approximately the same, the total number of bivalve larvae increased more than tenfold, perhaps indicating generally favorable conditions for the existence of these organisms.

As was predicted, setting of oysters became heavier August 25 to 29. The heaviest setting occurred at one station located at a 20-foot depth in the Milford area and one station at a 30-foot depth in Bridgeport. Five other stations indicated a setting that may be of commercial importance, but 3 stations registered only a light and scattered setting.

Since a high percentage of oyster spat found on the collectors on August 29 was one-day-old or younger, the setting was expected to continue for several days. This is especially true in the region of one station where the number of mature oyster larvae significantly increased.

As the situation appeared at the end of August, it was rather probable that, during this summer, certain sections of Long Island Sound had already obtained an oyster set of commercial magnitude. Whether this set will survive combined attacks of drills, starfish, and flatworms (Stylochus) will depend upon the distribution and occurrence of those enemies and the control measures employed by the industry.

Setting of starfish continued but was still extremely light. Examination of the last set of collectors revealed the presence of one starfish spat per 40 shells at two stations. (Bulletin No. 6, August 31, 1960, U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn.)

As of September 15, 1960: During the first ten days of September 1960 the bottom water temperature of the oyster-producing sections of Long Island Sound remained relatively steady, averaging between 72.0° F. and 73.0° F. However, hurricane "Donna" on September 12 somewhat reduced the temperature which on the day after the storm, ranged between 66.5° F. and 69.0° F.

Early in the month some mature oyster larvae were encountered in the plankton samples but, in general, their number began to show a decrease toward mid-September. On September 13 no oyster larvae were found in any of the samples. It is of interest, nevertheless, that the number of bivalve larvae other than oysters, mostly of the coot clam (Mulinia), was greater in the samples taken at all stations the day after the hurricane than in the collection made on September 9.

Larvae of the flatworm, possibly Stylochus, were encountered in the samples early in September and continued to occur in comparatively large numbers. A heavy setting of these oyster-killing worms has been recorded on spat collectors from Milford Harbor and Long Island Sound proper.

Setting of oysters continued during the first two weeks of September. Heaviest set was recorded at the same station where the largest number of mature larvae occurred in the samples collected on August 29. One station located on the State spawning bed in New Haven was the second best but, at one station, the intensity of setting sharply decreased, regardless of the fact that on August 29 the number of mature oyster larvae in that area was still considerable.

Examination of the collectors brought in on September 13 showed only a few spat. Some of them were only one day old, thus having set on the day of the hurricane. Considering the lateness of the season and almost total absence of oyster larvae in plankton samples, it is rather improbable that another wave of heavy setting of oysters will take place in Long Island Sound.

Setting of starfish virtually ceased. (Bulletin No. 7, September 15, 1960, U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn.)

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UPPER CHESAPEAKE BAY ESCAPED MSX MORTALITY IN AUGUST:

Scientists, who are working on the new mortality in Delaware and Chesapeake Bay, predicted that May, June, August, and early September were critical periods in which mortalities, presumably from MSX, could be expected. Oyster planters and state officials were watching the oysters anxiously in the areas adjacent to the known points of infection as well as areas where the mortalities occurred last fall and spring.

It appears, from reports from growers and packers, that heavy mortalities were not experienced in many areas heretofore free from MSX. The notable exception was losses of 15 to 30 percent of oysters planted off the mouth of the Rappahannock.

Since that area is relatively close to the area of heavy losses in the Bay off Mobjack, it appears that there has been little expansion of the zones of heavy damage. Even in the areas where 50 to 75 percent mortalities were found last year, the rate of losses,

appear to be substantially less than last year, and far less than is taking place in the same oysters placed on experimental test trays. No explanation can be made of this difference at present.

The zones of high mortality in lower Chesapeake still are confined to the western side of the Bay from off the Rappahannock River to the mouth of the Bay, to Mobjack Bay, the lower York River, and the lower James River.

Oysters in the James River seed area still are free from MSX. according to the Head of Shellfish Investigations of the Virginia Fisheries Laboratory. A shellfish biologist reports some mortality in Holland Straits of adult oysters, but explains that they are heavily infested with Dermocystidium, which might account for the losses.

* * * * *

SET BEST ON SHELLS SUSPENDED ON RACKS:

An experiment conducted in 1959 in the Cape Cod, Mass., area by biologists of the U. S. Bureau of Commercial Fisheries indicated that oysters set preferably on shells suspended on racks rather than on shells placed in bags on the bottom. The higher density of set on suspended shells was attributed to greater silting of bottom shells. This summer the experiment was repeated and bottom shells were flushed regularly and remained clean; still the oyster set on suspended shells was 3 times greater than on the bagged shells on the bottom.

Radiation Preservation

ARMY TO BUILD RESEARCH CENTER AT NATICK, MASS.:

An Army Quartermaster Research Facility, designed specifically for use in connection with the Army's irradiated food program, will be constructed at the Quartermaster Research and Engineering Center, Natick, Mass., it was announced on September 8, 1960, by the Department of the Army.

The research facility will be geared directly to the needs of a recently-announced revised six-year, $5 million Army program to accelerate research on specific irradiated foods for military use. The facility will include a megacurie Cobalt-60 source, a 24 MEV linear accelerator, and a supporting food preparation laboratory.

The research facility will be built in lieu of a full-scale production plant, originally planned to be constructed at Stockton, Calif. Construction of the Stockton plant was suspended in October 1959 pending further laboratory studies to determine the feasibility of radiation as a practical means of food preservation. The Natick facility will assist in these studies.

Much of the planning and equipment developed for the original Stockton plant at a cost of $1.3 million dollars will be adapted for use in the Natick facility. It is estimated that an additional $1.8 million will be required to establish the Natick facility.

The new facility is expected to be operational in about two years. The facility will be made available for use by other agencies working in this field.

Location of the facility at Natick was determined on the basis of a detailed survey conducted by the Army. The Army received technical assistance from the Atomic Energy Commission. Advice also was invited from the Departments of Agriculture, Commerce, Interior, State, and Health, Education and Welfare, together with the International Cooperation Administration, and the Small Business Administration. All of the above agencies are members of the Interdepartmental Committee on Radiation Preservation of Food, formed in 1956.

The Army study considered such factors as operational efficiency for maximum utilization by all users, site development, construction costs, product availability, and proximity of highways, railways, airways, and related transportation.

The Army program, which is administered by the Quartermaster General, concentrates on total sterilization to preserve food for long periods of time. This aspect of irradiated food is of greatest interest to the military. The Army program is being closely coordinated with a civilian research program being developed by the Atomic Energy Commission (AEC) and with the Interdepartmental Committee on Radiation Preservation of Food. The AEC program will concentrate on low-dose radiation processing of perishable food to extend shelf life.

Note: Also see Commercial Fisheries Review, May 1960 p. 29, Mar. 1960 p. 37, Oct. 1959 p. 16.

South Atlantic Exploratory Fishery Program

SCALLOP AND SHRIMP RESOURCES SURVEY OFF FLORIDA EAST COAST PLANNED:

M/V "Silver Bay" Cruise 26: The U. S. Bureau of Commercial Fisheries chartered fishing vessel Silver Bay was scheduled to

leave Brunswick, Ga., on October 18, 1960, to make a 5-week survey of the scallop and shrimp resources off the coast of Florida, between Cape Canaveral and Key West.

Due to the number of requests for another series of scallop-dredging demonstration trips, similar to the series conducted in June this year, daily trips from Ft. Pierce, Fla., were scheduled for October 19-21. Interested persons were invited to accompany the Silver Bay.

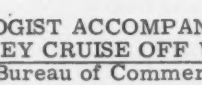
Tuna

U. S. BIOLOGIST ACCOMPANIES NORWEGIAN SURVEY CRUISE OFF WEST AFRICA:

A U. S. Bureau of Commercial Fisheries biologist from the San Diego, Calif., Biological Laboratory staff was an observer aboard the Norwegian research vessel Johan Hjort while on a two-months cruise to African waters, which began about October 1, 1960. Ten Norwegian commercial fishing vessels accompanied the research vessel.

Purpose of the expedition was to determine if it is feasible for Norwegian vessels to develop a tuna fishery south of Dakar, West Africa.

The United States biologist studied the use of sonar equipment in locating and tracking tuna. The invitation to join the cruise came to the Bureau from the Director of the Institute of Marine Research, Bergen, Norway.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, JULY 1960:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during July 1960 increased by 6.9 percent in quantity, but were lower by 1.3 percent in value as compared with June 1960. The increase in quantity was due primarily to higher imports of groundfish fillets (up 8.4 million pounds) and frozen tuna other than albacore (up 3.7 million pounds), and to a lesser degree, an increase in the imports of fresh and frozen salmon and fresh swordfish. The increases were partly offset by a 3.9-million-pound decrease in the imports of lobster and spiny lobster and a drop of 1.6 million pounds in the imports of frozen shrimp.

Compared with July 1959, the imports in July this year were down 1.3 percent in quantity and 6.3 percent in value due to lower imports of most of the major imported fishery products. Compensating, in part, for the decreases was an increase of about 4.3 million pounds in the imports of frozen albacore and other tuna.

United States Imports and Exports of Edible Fishery Products, July 1960 with Comparisons

Item	QUANTITY			VALUE		
	July		Year	July		Year
	1960	1959	1959	1960	1959	1959
	(Millions of Lbs.)			(Millions of $)		
Imports:						
Fish & shellfish: Fresh, frozen, & processed 1/	92.2	93.4	1,070.5	25.3	27.0	309.8
Exports:						
Fish & shellfish: Processed only 1/ (excluding fresh & frozen)	2.1	6.2	68.0	1.0	1.4	22.8

1/ Includes pastes, sauces, clam chowder and juice, and other specialities.

United States exports of processed fish and shellfish in July 1960 were higher by 38.8 percent in quantity and 25.0 percent in value as compared with June 1960. Compared with the same month in 1959, the exports this July were lower by 66.5 percent in quantity and 28.6 percent in value. The drop in exports in July this year as compared with the same month in 1959 was due to sharply lower exports of canned California sardines and squid.

* * * * *

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1960 at the 12½-percent rate of duty is 53,448,330 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports from January 1-September 3, 1960 amounted to 32,925,519 pounds, according to data compiled by the Bureau of Customs. From January 1-August 29, 1959, a total of 31,345,084 pounds had been imported.

* * * * *

IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-JUNE 1960:

During the first half of 1960, the pattern of United States imports showed declines in some of the major commodities. Frozen groundfish and ocean perch fillets, frozen tuna, and fish meal imports decreased; shrimp and fresh or frozen lobster imports increased.

Exports of fish oils exceeded the levels reached during the first half of 1959, a record year. Canned salmon and canned sardine exports were down; shrimp and squid exports were up.

Imports: GROUNDFISH AND OCEAN PERCH FILLETS AND BLOCKS: Imports of 32,946,000 pounds of frozen fillets during January-June 1960 were 40 percent less than during the first six months of 1959. Receipts from Canada, Denmark, Norway, and Iceland were lower. Imports of frozen blocks or slabs (33,886,000 pounds) were up 25 percent. Canada supplied 44 percent of the imported fish blocks.

TUNA, FRESH AND FROZEN: Frozen albacore imports of 36,971,000 pounds during January-June 1960 were 52 percent above the like period of 1959. Nearly all was received from Japan. Frozen yellowfin and other tuna imports of 69,807,000 pounds, on the other hand, declined 26 percent. Frozen yellowfin and other tuna imports from Japan were 42 percent less than during the first half of 1959.

TUNA, CANNED IN BRINE: During the first six months of 1960, imports of 6,738,000 pounds of canned white-meat tuna in brine were up 31 percent; imports of 16,156,000 pounds of canned light-meat tuna in brine were down 9 percent. Total receipts of canned tuna in brine were only slightly more than for the like period of 1959. As in the past, Japan was by far the leading supplier.

SHRIMP, MOSTLY FROZEN: Imports of 51,365,000 pounds during January-June 1960 were 3 percent higher than in January-June 1959. Supplying about two-thirds of the total, Mexico continued to account for the major part of the imports. Receipts from El Salvador were 3,241,000 pounds, more than three times those of the like period in 1959. Receipts from Japan, on the other hand, were 1,373,000 pounds or about one-fourth those of the comparable period of 1959. Imports of 1,069,000 pounds from India were down 20 percent.

LOBSTER AND SPINY LOBSTER, FRESH OR FROZEN: During the first six months of 1960, imports of northern lobsters were 14,564,000 pounds and imports of spiny lobsters were 18,475,000 pounds; both totals were higher than those of the similar period of 1959. Canada, Australia, and the Union of South Africa were the major suppliers.

SALMON, CANNED AND FRESH OR FROZEN: Imports of 12,541,000 pounds of canned salmon, nearly all from Japan, were 28 percent below those of January-June 1959. Imports of 2,632,000 pounds of fresh or frozen salmon, nearly all from Canada, were down 53 percent from those of a year earlier.

CANNED SARDINES: Due probably to reduced supplies of the domestic product, January-June 1960 imports of 5,000,000 pounds of canned sardines not-in-oil were nearly five times those imported during all of 1959. The Union of South Africa supplied 90 percent of the total. With Norway and Portugal supplying the major share, imports of 10,358,000 pounds of canned sardines in oil were 8 percent above those of the first half of 1959.

CANNED CRABMEAT AND CANNED OYSTERS: Japan supplied nearly all the canned crab meat and oysters imported into the United States. Imports of 2,978,000 pounds of canned oysters were 6 percent above those of January-June 1959. Imports of 1,246,000 pounds of canned crab meat declined sharply and were 71 percent less than those of the comparable period of 1959.

SEA SCALLOPS, FRESH OR FROZEN: During the first half of 1960, imports of 3,095,000 pounds were 85 percent above those of the similar period of 1959. The 2,744,000 pounds received from Canada were more than double those received during the like period of 1959.

FISH MEAL: During January-June 1960, imports of 66,375 short tons were only two-thirds those of the like period of 1959. Imports from Peru were 10 percent less than in 1959 and accounted for nearly one-half of the six-months' receipts; Canada supplied nearly one-third. No fish meal was received from Angola, which supplied 20,738 tons during the first half of 1959.

FISH SOLUBLES: Imports of 2,518 tons during the first six months of 1960 were only one-fourth those of the like period of 1959.

Exports: CANNED SARDINES, NOT-IN-OIL: During the first half of 1960, exports of 9,878,000 pounds were 73 percent below those of the like period of 1959. The Philippines, although the destination of more than half the exports, took 36 percent less than during the comparable period of 1959. Cuba, the second leading market in 1959, has taken only minor quantities in 1960.

CANNED SALMON: Exports of 2,583,000 pounds for January-June 1960 were 41 percent less than in the same period of 1959.

SHRIMP, FRESH, OR FROZEN AND CANNED: Canada took the major share of United States exports of shrimp products. Exports of fresh or frozen shrimp and of canned shrimp in January-June 1960, were each 1,234,000 pounds. Exports of fresh or frozen shrimp, however, were 63 percent higher than in January-June 1959; exports of canned shrimp were up 10 percent.

CANNED SQUID: During the first half of 1960, exports of 5,860,000 pounds were 15 percent above those of the 1959 period. The import controls initiated by the Philippines in April 1960, resulted in a drop in the exports to that country from 3,924,000 pounds in January-March to 434,000 pounds in April-June. Exports to Greece of 1,403,000 pounds were 25 percent less than in the comparable period of 1959.

FISH OILS: During the first half of 1960, exports of 52,820,000 pounds were 7 percent above those of the comparable period of 1959. The Netherlands and West Germany took 40,893,000 pounds. Sweden and Norway were other important outlets.

* * * * *

IMPORTS OF FISHERY PRODUCTS AT NEW HIGH DURING 1959:

For the tenth straight year, the annual value of United States imports of fishery products (edible and inedible, including all types of byproducts) has set a new record high. The 1959 value of fishery products imported into the United States was $366.5 million, a gain of 12 percent over 1958 and 85 percent above 1950. Of the total, the value of fishery products for food uses was $311.0 million and that for industrial purposes, $55.5 million.

The United States continued as the world's leading importer of fishery products. Imports contributed the following share to the

United States supply of selected fishery products: groundfish and ocean perch fillets and blocks--67 percent; frozen tuna--50 percent; shrimp--42 percent; fresh or frozen northern lobster--42 percent; spiny lobster--89 percent; canned crabmeat--71 percent; and fish meal--28 percent. In most of those categories, imports made a substantial gain.

In 1959, 108 countries shared in the United States market for fishery products. For countries like Japan, fishery products were an important segment of their trade with the United States. Mexico earns a large part of its dollar exchange from the sale of shrimp. Likewise, frozen fish provides considerable dollar exchange for Canada and Iceland.

Trends by Countries: Canada, Japan, and Mexico continued to be the leading suppliers of fishery products imported into the United States (table 1). Products from those countries accounted for 63 percent of the total value of all fishery imports. Norway, Peru, Union of South Africa, Iceland, Denmark, and Australia were other leading suppliers.

Table 1 - Value of United States Imports of Fishery Products, by Selected Countries of Origin, 1956-59

Country	1956	1957	1958	1959
			($1,000)	
Canada	95,483	97,404	107,005	101,967
Japan	70,800	77,202	84,872	96,226
Mexico	27,815	25,248	28,005	32,869
Norway	13,620	11,144	12,087	16,405
Peru	7,320	9,167	10,907	16,374
Union of South Africa	8,039	8,554	9,332	12,090
Iceland	6,200	6,022	8,775	10,000
Denmark	2,887	3,463	5,728	8,239
Australia	6,609	7,766	7,665	8,180
Panama	4,269	6,291	5,852	6,458
Portugal	4,907	5,507	5,177	5,452
Cuba	8,158	6,282	5,542	4,810
Ecuador	2,308	3,075	3,510	4,159
Angola	742	1,046	2,065	3,023
Brazil	2,976	2,337	2,359	3,002
Netherlands	928	2,496	1,509	2,628
United Kingdom	2,033	1,540	1,787	2,388
India	1,328	1,407	1,547	2,239
France	2,273	1,139	1,169	2,230
Chile	1,673	1,130	2,007	1,282
Other	10,829	19,223	20,271	26,479
Total	281,197	297,443	327,171	366,500

Note: Value at the foreign port of shipment.

During 1956-59, significant increases occurred in annual imports from many countries including Japan, Peru, and Denmark.

CANADA: During 1959, Canada was again the leading supplier of fishery products to the United States market. As usual, a wide variety of Canadian fishery products were imported. Fresh or frozen fish and shellfish accounted for the largest part.

Table 2 - Value of United States Fishery Products Imports from Canada, 1959

Product	Value
Fresh or frozen:	$1,000
Lobster	13,802
Groundfish fillets	13,191
Fresh-water fish	11,220
Salmon	7,212
Fresh-water fish fillets	6,052
Halibut	5,714
Flounder fillets	4,176
Fish blocks	3,850
Canned lobster	4,099
Fish meal and scrap	4,776
Other fishery products	21,736
Total	$101,967

JAPAN: The value of fishery imports from Japan reached a record $96.2 million in 1959 (table 3).

Table 3 - Value of United States Imports of Fishery Products from Japan, 1959

Product	Value
Fresh or frozen:	$1,000
Albacore tuna	7,787
Other tuna	12,642
Shrimp	5,051
Swordfish fillets	4,323
Canned:	
Light-meat tuna in brine	13,254
White-meat tuna in brine	4,567
Salmon	10,778
Crab meat	7,908
Pearls, cultivated	12,875
Other	17,041
Total	$96,226

As shown in table 1, imports from Japan have steadily increased, and that country may soon surpass Canada as the leading foreign supplier of fishery products to the United States market. Various tuna products account for a major part of the trade.

MEXICO: During 1959, Mexico supplied 64 percent of the total quantity of shrimp imported into the United States. Owing to these shrimp imports, Mexico was again the third leading supplier. The value of shrimp imports was more than 5 times that of all other fishery products received from Mexico--shrimp imports were valued at $27.8 million and imports of all other types of fishery products from Mexico were valued at $5.1 million; total imports, $32.9 million.

Table 4 - Important United States Fishery Products Imports from Countries other than Canada, Japan, and Mexico, 1959

Country	Product	Value
		$1,000
Norway	Canned sardines	5,052
Peru	Fish meal	4,675
Union of South Africa	Frozen spiny lobster	7,897
Iceland	Groundfish fillets and blocks	6,052
Denmark	Frozen fillets and blocks	3,254
Australia	Frozen spiny lobster	7,392
Panama	Shrimp (mostly frozen)	6,259
Portugal	Canned sardines	6,623

OTHER COUNTRIES: In 1959, the most important fishery products imported from other leading suppliers included canned sardines, spiny lobsters, fillets, and fish meal (table 4).

Area of Origin: In 1959, the United States imported more fishery products from other North American countries than from any other area (table 5). The value of those imports was $151.8 million or 41 percent of the total. Asia, owing primarily to products originating in Japan, was the next leading source. Europe, South America, Africa, and Oceania followed in that order.

Table 5 - United States Imports of Fishery Products by Area of Origin, 1959

Area	Edible	Inedible	Total
	($1,000)		
North America	143,282	8,559	151,841
Asia	80,463	21,863	102,326
Europe	46,617	8,215	54,832
South America	18,253	10,807	29,060
Africa	11,801	5,521	17,322
Oceania	10,617	502	11,119
Total	311,033	55,467	366,500

Note: Value at the foreign port of shipment.

Trends by Commodities: In 1959, value-wise, fresh or frozen shrimp was again the leading commodity in the import trade (table 6). The other leading products in descending importance were fresh or frozen groundfish and ocean perch fillets and blocks, fresh or frozen lobster, frozen tuna, canned tuna, fish meal, pearls, and canned salmon.

Table 6 - United States Imports of Fishery Products, by Selected Commodities, 1956-1959

Commodity	1956	1957	1958	1959
Edible Products:		($1,000)		
Fresh or frozen:				
Shrimp	32,986	35,415	43,162	52,306
Tuna	15,337	16,765	25,377	29,728
Groundfish fillets and blocks	25,987	27,417	30,431	38,759
Lobster	34,285	36,827	35,661	38,635
Other	50,663	55,575	63,243	60,940
Total fresh or frozen	159,258	171,999	197,874	220,368
Canned:				
Tuna	14,998	17,002	16,882	21,688
Salmon	11,650	9,470	11,271	11,130
Sardines	7,110	8,957	8,564	8,370
Crab meat	5,318	6,254	6,116	7,947
Lobster	5,031	5,017	3,952	6,441
Other	13,486	14,645	15,561	17,083
Total canned	57,593	61,345	62,346	72,659
Other edible products	16,315	17,612	19,992	18,006
Inedible Products:				
Fish meal	11,518	9,717	11,335	15,884
Pearls	8,651	9,989	10,944	13,678
Other	27,862	26,781	24,680	25,905
Total inedible	48,031	46,487	46,959	55,467
Total fishery imports	281,197	297,443	327,171	366,500

Note: Value at the foreign port of shipment.

SHRIMP: Imports of shrimp rose to record high levels during 1959. The value of imports reached $52.3 million. The principal supplier was Mexico, but increased quantities were received in 1959 from a number of countries, including Japan, Ecuador, Panama, India, and El Salvador.

TUNA: During 1959, the value of frozen tuna imports was $29.7 million; the value of canned tuna, $21.7 million. Japan is by far the leading supplier of frozen and canned tuna. A significant increase occurred in imports of canned tuna from Spain and Portugal.

GROUNDFISH AND OCEAN PERCH FILLETS AND BLOCKS: In 1959, imports of fresh and frozen groundfish and ocean perch fillets and blocks reached a record high of $38.8 million. The value of the frozen fish blocks alone was $17.0 million or more than double imports during 1956. The principal sources of imported fillets and blocks were Canada and Iceland. Other important suppliers were Norway and Denmark.

LOBSTER: Imports were of two main types of lobster, northern lobster and spiny lobster. Canada supplies nearly all the northern lobster imported. The Union of South Africa, Cuba, and Australia have been the leading suppliers of spiny lobster. Imports of fresh or frozen lobster were valued at $38.6 million canned lobster, $6.4 million.

FISH MEAL: The quantity imported during 1959 was valued at $15.9 million. Peru, Canada, Angola, Union of South Africa, and Chile were leading suppliers to the United States.

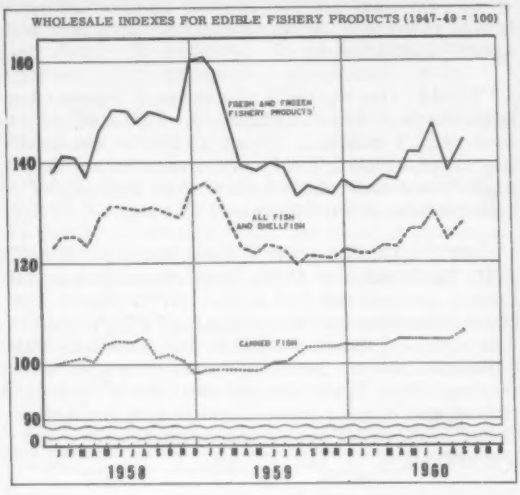
Duties Collected: Duties collected on imports of fishery products into the United States during 1959 totaled a record $17.7 million (table 7).

Table 7 - Duties Collected on Imports of Fishery Products into the United States, 1959

Year	Duties Collected	Average Ad Valorem Equivalent
	$1,000	Percent
1959	17,737	4.8
1958	16,645	5.1
1957	15,955	5.4
1956	15,504	5.5

Wholesale Prices, September 1960

The mid-September 1960 wholesale price index for edible fishery products (fresh, frozen, and canned) at 128.1 percent of the 1947-49 average was up 3.0 percent from the preceding month, and up 5.3 percent from the same month of 1959. The increase from August to September 1960 was due mainly to higher prices for haddock (drawn and filleted) and the fresh-water varieties. Prices in September this year were also up from September last year due to higher prices for canned and fresh salmon and for both fresh and frozen shrimp.



The wholesale price index for the drawn, dressed, and whole finfish subgroup in September this year increased

Washing fish boxes on the Boston Fish Pier.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, September 1960 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ ($)		Indexes (1947-49=100)			
			Sept. 1960	Aug. 1960	Sept. 1960	Aug. 1960	July 1960	Sept. 1959
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					128.1	124.4	129.9	121.6
Fresh & Frozen Fishery Products:					143.7	138.5	147.7	134.8
Drawn, Dressed, or Whole Finfish:					169.8	158.1	165.1	159.9
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.09	120.4	88.9	136.8	153.1
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.31	.36	95.4	109.9	106.2	101.1
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.94	.90	210.6	202.2	198.0	179.7
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.74	.64	183.5	158.7	156.2	179.7
Whitefish, L. Erie pound or gill net, rnd., fresh.	New York	lb.	1.00	.74	202.3	149.7	136.6	146.7
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.77	.73	179.4	170.0	158.3	170.0
Processed, Fresh (Fish & Shellfish):					137.0	131.6	146.0	124.3
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.32	.27	108.9	90.2	154.8	117.4
Shrimp, lge. (26-30 count), headless, fresh.	New York	lb.	.72	.68	114.1	106.6	124.8	105.1
Oysters, shucked, standards	Norfolk	gal.	7.00	7.00	173.2	173.2	173.2	151.6
Processed, Frozen (Fish & Shellfish):					110.1	112.6	117.8	107.2
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.39	.39	100.8	102.1	100.8	98.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.28	.27	87.9	84.8	84.8	102.0
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.7	108.7	106.7	108.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.69	.72	106.5	111.5	121.5	98.0
Canned Fishery Products:					106.5	104.8	104.8	103.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	25.50	24.50	133.0	127.8	127.8	127.8
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.10	11.10	80.0	80.0	80.0	77.9
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.65	8.00	89.8	93.9	93.9	88.1
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	93.1

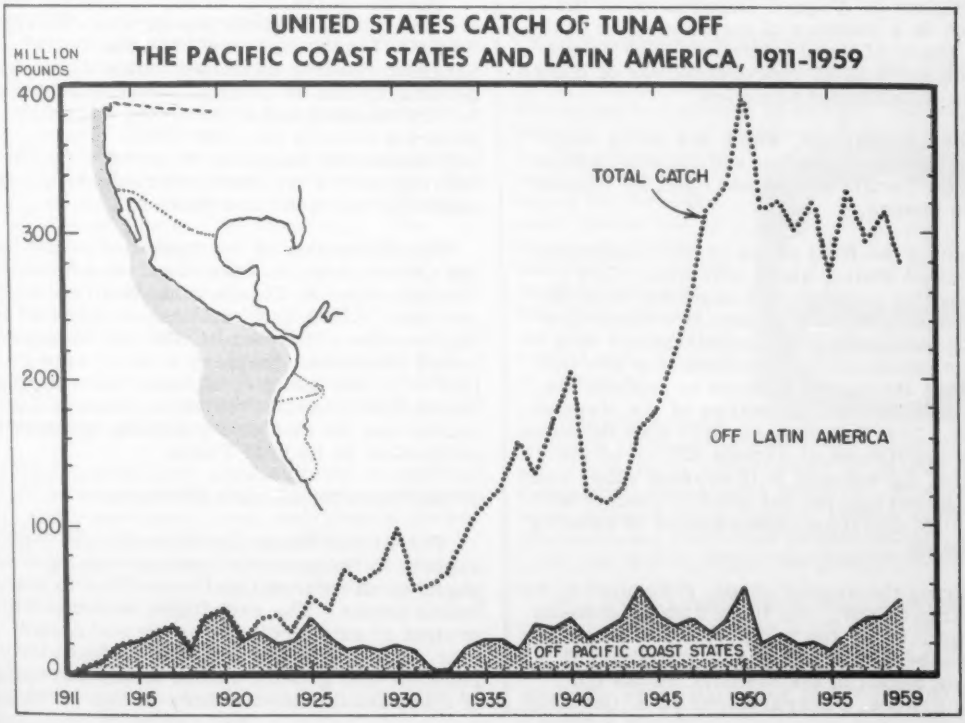
1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

7.4 percent as compared with August. An increase of about 35.4 percent (3 cents a pound) in ex-vessel prices for large haddock at Boston, plus a further increase of 4.2 percent in the fresh king salmon price at New York, and some increases in the prices for the fresh-water species were responsible for the increase from mid-August to mid-September 1960. Lower wholesale prices (down 13.2 percent) for frozen dressed Pacific halibut failed to offset the increases. From September a year ago to this September the wholesale price index increased 6.2 percent, due to a sharply higher price (up 17.2 percent) for fresh king salmon and higher prices for the fresh-water varieties during the Jewish holidays. These increases were partially offset by lower prices for fresh large drawn haddock (down 21.4 percent) and frozen dressed Pacific halibut (down 5.6 percent).

The fresh processed fish and shellfish subgroup wholesale index this September rose 4.1 percent from the preceding month. Lighter landings of small fresh haddock at Boston resulted in an increase of 20.7 percent in the price of small haddock fillets. In addition, the wholesale price for fresh shrimp at New York City advanced 7.0 percent. From September 1959 to September this year, the subgroup price index increased 10.2 percent due to a higher (14.2 percent) shucked oyster price and a higher (8.6 percent) fresh shrimp price. These increases were partly balanced out by a drop of 7.2 percent in the price for fresh small haddock fillets at Boston.

The mid-month September wholesale price index for the frozen processed fish and shellfish subgroup declined by 2.2 percent from August to September this year. A drop of 4.5 percent in the frozen shrimp (26-30 count) price at Chicago and a slightly lower frozen flounder fillet price were responsible for the change. An increase of about 1 cent a pound in the price for frozen small haddock fillets partially offset the increases. However, from September last year to this September the subgroup price index rose by 2.7 percent. Increases of about 2.0 percent for frozen flounder fillets and 8.7 percent for frozen shrimp more than offset a 13.8-percent drop in the frozen small haddock fillet price in September this year as compared with the same month of 1959. Prices for frozen ocean perch fillets were about unchanged from August to September this year and also about unchanged from September a year ago.

The canned fish primary price index this September was up 1.6 percent from the preceding month due to a 4.1-percent higher canned pink salmon price. Supplies of canned pink salmon from the 1960 pack are short. This increase more than offset a drop of 4.4 percent in the canners' opening price for the 1960 pack of California sardines. The lower price for California sardines is purely tentative as the new packing season was off to a slow start. Wholesale prices for canned fish this September were up 3.0 percent from September last year with the exception of the Maine sardine price which was unchanged.



International

GENERAL AGREEMENT ON TARIFFS AND TRADE

INTERNATIONAL TARIFF NEGOTIATIONS CONFERENCE OPENED SEPTEMBER 1, 1960:

Clarence B. Randall, Special Assistant to the President and Chairman of the Committee on Foreign Economic Policy, represented the United States at the opening meeting of the multilateral tariff negotiations conference on September 1, 1960, in Geneva, Switzerland. Carl D. Corse, a foreign service officer, is Chairman of the United States delegation to the conference.

William A. Vogely, Department of the Interior, is a member of the delegation at the first phase of the conference. The delegation consists of 21 representatives of United States Government agencies.

The negotiations, which are being held under the framework of the General Agreement on Tariffs and Trade (GATT), consist of two phases.

During the first phase of the conference, the United States, along with other GATT contracting parties, will negotiate with the Commission of the European Economic Community concerning the establishment of a new schedule of tariff concessions for the Common Market as a whole to replace the present individual schedules of the Member States. The United States will also negotiate, under provisions of Article XXVIII of the General Agreement, with several other contracting parties for the modification or withdrawal of individual concessions in existing schedules.

During the second phase, scheduled to begin early in 1961, the United States expects to negotiate for the reciprocal exchange of new concessions with the Commission of the EEC on behalf of the Member States (Belgium, France, Federal Republic of Germany, Italy, Luxembourg, and the Netherlands) and at least 20 other countries which are contracting parties to the GATT or which are expected to negotiate for accession to the Agreement.

GENERAL FISHERIES COUNCIL FOR THE MEDITERRANEAN

SIXTH SESSION HELD IN ROME:

Delegates from 11 Mediterranean countries plus observers from four international organizations met at the Rome headquarters of the Food and Agriculture Organization (FAO) September 22-28, for the sixth session of the General Fisheries Council for the Mediterranean (GFCM).

The delegates, representing Spain, France, Monaco, Italy, Yugoslavia, Greece, Turkey, Tunisia, Morocco, Israel, and the United Kingdom (Malta), discussed some 40 working documents and 50 technical papers prepared for the meeting and drew up the Council's program of work for 1961-1962. The working documents ranged from a paper on fishing with lights to a document on dispensing information to aid fish consumption.

The delegates, at the invitation of the Italian Government, and the observers from the Organization for European Economic Co-operation (OEEC), the International Council for Exploration of the Sea (ICES), the European Inland Fisheries Advisory Committee (EIFAC), and the International Labor Organization (ILO), visited the fishing port of Terracina and the station for fishing and mussel cultivation at Lago di Paola.

INTERNATIONAL INDIAN OCEAN EXPEDITION

The United States Government will lend support to the nation's leading oceanographers in an international expedition to the Indian Ocean. The expedition, a scientific project of extraordinary scope and magnitude, begins late this year and extends through 1964. It will greatly extend man's knowledge of these least-known waters of the world,

International (Contd.):

which cover a seventh of the earth's surface, a June 13, 1960, announcement from the White House pointed out.

Like the recent International Geophysical Year, the International Indian Ocean Expedition will incorporate a many-sided scientific attack on a single area of interest under the leadership of a special committee of the International Council of Scientific Unions, a nongovernmental organization with headquarters in The Hague. Scientific responsibility for United States participation will be borne by the National Academy of Sciences-National Research Council, national representative to the International Council.

Acting upon the recommendation of the Federal Council for Science and Technology and the Special Assistant to the President for Science and Technology, the President approved a plan calling for key contributions by the Department of the Navy and the National Science Foundation. The Navy will make available oceanographic ships sponsored by the Navy and operated by leading United States oceanographic institutions. The Foundation will be responsible for planning and coordinating Federal support for United States participation in the program including the provision of financial support.

Responsibility for planning the scientific content of the United States program has been assigned by the Academy-Research Council to its Committee on Oceanography. The Committee has expressed the hope that the Expedition, in addition to its anticipated contributions to fundamental knowledge, will afford unusual benefits to the heavily populated, protein-deficient nations on the ocean's perimeter, both in terms of increased fish harvests and in the further training of local scientists and technologists in the techniques of oceanographic research.

The Expedition's peak activity is expected to occur during 1962 and 1963 when ships and scientific personnel from well over a dozen nations will be conducting basic research in physical and chemical oceanography, meteorology, marine biology, geophysics, and submarine geology.

The problems to be studied are in the fields of physical and chemical oceanography, meteorology, marine biology, and marine geology and geophysics.

The proposed research will provide fundamental and valuable scientific knowledge. Some findings will have direct and immediate bearing on economic development and human welfare. Location of shoals and regions of upwelling will identify likely fishing areas. Studies of distribution, nature, and seasonal variation in nutrients and marine organisms will indicate what to fish for and when. Preliminary quantitative estimates of fish population, when supplemented by exploratory fishing, will suggest the magnitude of the fishery resource.

The data obtained will provide an essential part of the information on which decisions can ultimately be reached on the nature of fishery operations, markets and methods of marketing, extent of investment, and related development problems. A new source of protein could mean food for hungry people. If it came from the ocean, land and other capital devoted to protein food raising could be shifted to other uses. Marine organisms could also provide fertilizer and animal feed in areas now lacking adequate supplies.

NORTHWEST ATLANTIC FISHERIES COMMISSION

TENTH ANNUAL MEETING:

The Tenth Annual Meeting of the International Commission for the Northwest Atlantic Fisheries was opened in Bergen, Norway, on May 30, 1960, and continued through to June 3. The meeting was preceded by a meeting of the Assessment Group and by meetings of the Standing Committee on Research and Statistics and its various subcommittees, and by Groups of Advisers.

Commissioners from all 12 member countries, most of them accompanied by experts and advisers, participated in the Annual Meeting. Observers were present from Poland, from a number of International Fisheries Organizations, and from the World Meteorological Organization.

The annual revision of panel memberships resulted in an increase from 28 to 32: The Federal Republic of West Germany and the United Kingdom each taking membership in Panel 2, while Italy took memberships in Panels 3 and 4.

International (Contd.):

The Committee on Finance and Administration proposed a budget of $59,300 for 1960/61; this budget was adopted by the Commission. The increase of over $6,000 as compared to the previous year's budget was mainly caused by expenses for traveling of scientists to small group meetings for the completion of special tasks set by the Commission.

The 1961 Annual Meeting will convene in Washington, D. C., on June 5, 1961. The 1961 Annual Meeting will be preceded by a Marking Symposium lasting for four days. The Commission further accepted an invitation by the U. S. S. R. to convene the 1962 Annual Meeting of the Commission in Moscow.

The Committee on Research and Statistics and its various subcommittees concentrated its work on the two major tasks: (a) Fishery Assessment in Relation to Regulation Problems and (b) Environmental Studies. Under (a) the Committee considered the progress report by the Assessment Group and the steps needed for the completion of the task and recommended that the Group for this purpose should meet for two weeks in Lowestoft in February 1961. Under (b) the Committee considered which tasks should be given priority in a program for environmental studies, and it stressed the urgent need for more close cooperation between biologists and hydrographers. To achieve this it recommended that a small group of biologists and hydrographers should meet the following year to consider problems related to environmental research, and that a Symposium on "the Influence of the Environment on the Distribution and Abundance of the Principal Groundfish in the ICNAF Area" be held in 1962 or 1963.

The Committee further dealt with problems connected with fisheries statistics, mainly those arising from the Joint FAO/ICES/ICNAF meeting in Edinburgh, with sampling of fish stocks, with gear and selectivity, and with aging techniques. It further considered the plans for the Marking Symposium to be held in 1961.

The reports of the Committee were presented by the Chairman to a special meeting of Commissioners, as well as to the Plenary, where the various recommendations were adopted by the Commission.

In meetings of the five panels and of their groups of advisers, the status of the fisheries and the researches in the different subareas was considered, and plans for future work were elaborated.

Note: Also see Commercial Fisheries Review, February 1960, p. 60.

MARINE OILS

IMPORTS BY WESTERN EUROPE WILL DROP IN 1960:

Western Europe's net imports of whale oil and other marine-animal oils in 1960 will drop about 2.6 percent or 6,000 metric tons from the 231,000 tons imported in 1959. But Western Europe's imports of marine oils forecast for 1960 and the preliminary total for 1959 are still sharply higher than the 169,700 tons imported in 1958.

Net Imports of Marine Oils by Western Europe by Commodity and Area, Annual 1958 and 1959, Forecast 1960

Commodity	Forecast 1960			1959 1/			1958 2/		
	Northwestern Europe 3/	Mediterranean Countries 4/	Total	Northwestern Europe 3/	Mediterranean Countries 4/	Total	Northwestern Europe 3/	Mediterranean Countries 4/	Total
	(1,000 Metric Tons)								
Marine oils:									
Whale oil	110	-	110	110.8	(-3.1)	107.7	126.1	(-1.1)	125.0
Other marine 5/	110	5	115	117.4	5.9	123.3	39.6	5.1	44.7
Total	220	5	225	228.2	2.8	231.0	165.7	4.0	169.7

1/Preliminary.
2/Revised.
3/Includes Austria, Belgium-Luxembourg, Denmark, Finland, France, West Germany, Ireland, Netherlands, Norway, Sweden, Switzerland, and the United Kingdom.
4/Includes Greece, Italy, Portugal, Spain, and Yugoslavia.
5/Includes sperm oil and whale oil where not separately classified.

International (Contd.):

In 1960 it is predicted that Western Europe whale-oil imports will be up about 2.1 percent, but other marine oils will drop by 6.7 percent as compared with the preliminary totals for 1959. (Foreign Crops and Markets, August 1, 1960, U. S. Department of Agriculture.)

UNITED STATES TO HOST WORLD CONFERENCE ON FISHERY PRODUCTS NUTRITION

The United States Government will serve as host to a world conference on the nutritional value of fishery products, the Department of the Interior and Department of State announced August 26, 1960.

The conference will be sponsored by the Food and Agriculture Organization (FAO) of the United Nations. Approximately 400 authorities on nutrition, representing some 80 nations, are expected to attend the conference to be held in Washington, D. C., during the last two weeks in September 1961.

In announcing the conference, Assistant Secretary of the Interior Ross Leffler said: "The world's fisheries represent one of the few natural sources of nutritionally-valuable animal protein. They constitute a rich reservoir of food for the underdeveloped and overpopulated countries of the world. This conference, the results of which may well justify the first organized steps toward systematized farming of the seas, is part of the program of our Government and the Food and Agriculture Organization to 'Free the World from Hunger'."

The conference will deal with the unique nutritional benefits of fishery products, both for human food and for animal feeding. Recent nutritional research findings by the U. S. Bureau of Commercial Fisheries have shown the importance of fishery products to the public health. The unsaturated fats in fish have been demonstrated to be most effective in reducing the elevated blood cholesterol levels commonly associated with heart diseases. Fish are the only source of animal protein food in which this type of fat is found in abundance.

Fishery products have also proved to be very useful in specialized low-sodium, low-fat, low-carbohydrate diets which are necessary for the treatment of certain disease conditions. Many findings by animal nutritionists have pointed out the value of industrial fishery products in increasing growth rates and feed efficiency in poultry.

The conference on nutritive value of fishery products will be concerned with a field of work in which the United States is conducting substantial research and in which sufficient progress has been made so that delegates from other countries will be able to profit from the results.

A great deal of work has also been done in other countries, and one of the most important tasks of the conference will be to assemble this wealth of widely-dispersed research information. So far, very little compilation of the world's research on nutritional values in fish and shellfish has been undertaken by investigators.

It is expected that several authoritative reference texts on the nutritional value of industrial and edible fishery products will be published as a result of the conference. The proceedings of the conference will also be of value to government and industry research people in planning the future direction that nutritional research on fishery products should take.

The conference will be of considerable value to underdeveloped countries, because protein malnutrition is the most serious dietary disease in the world today, affecting nearly two-thirds of the world's population. It will also provide nutritional researchers with the opportunity to attract worldwide attention to recent remarkable findings in fishery products.

Angola

FISHING INDUSTRIES INSTITUTE OF ANGOLA CREATED:

According to press reports, a decree of the Portuguese Ministry of Overseas, published in Lisbon in the Diario do Governo, created the Fishing Industries Institute of Angola (Instituto das Industrias de Pesca de Angola). The Ministerial Decree becomes effective in Angola upon its publication in the Boletim Oficial de Angola. The Institute's headquarters are to be in Luanda with offices in Benguela and Mocamedes, the two other principal fishing centers. The Institute is to take over the responsibilities of the Federation of Fish Guilds (Federacao dos Gremios de Pesca) which by the terms of the decree is abolished.

The Institute will be active in the industry in economic, scientific, and technological matters. It is to conduct scientific studies, reorganize the industrial units, and assist in marketing. The reorganization is to be based on plans submitted by two experts who are now engaged in conducting a study of the industry. The Ministerial Decree creating the Institute is reported to provide that the Fund to Support the Fishing Industry (Fundo de Apoio a Industrias de Pesca) is to help finance the renovation and modernization of the industry.

Commenting to newspaper reporters on these changes, the Institute's president reviewed the plight of the Angolan fishing industry. He said that the fish have returned to the waters of the Mocamedes fishing district (e.g. off Mocamedes, Porto Alexandre, and Baia dos Tigres), however the 3-year decline in the fish catches of the fishing centers at Benguela and Luanda has not been broken. The Angolan fishing industry does not have a solid base. It has concentrated on producing byproducts (fish meal and oil) instead of dried and canned fish which are primary fish products. The president of the Institute also commented on the international fish-meal market and efforts to overcome the harm caused to the producers by overproduction. He is reported as having stated that the principal objective of the International Association of

Angola (Contd.):

Fish Meal Manufacturers at the present time is to conduct a study on production quotas and price fixing in the international market. (United States Consulate, Luanda, August 24, 1960.)

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FISH MEAL AND OIL PRODUCTION AND COSTS, 1959 AND FIRST QUARTER 1960:

Angola's production of fish meal during the first quarter of 1960 of 3,465 metric tons was down sharply (about 81.2 percent) from the 18,401 tons produced in the same period of 1959. Total production in 1959 was 56,170 tons, valued at US$6,155,000. The drop in the value per metric ton from the first quarter of 1959 to the same quarter this year was from about US$146 to $109, or 25.3 percent. Stocks of fish meal on hand in July 1960 (according to estimates by the Federation of Fish Guilds) were as follows: Mocamedes area: mechanized plants, 10,705 metric tons; Benguela area: mechanized plants, 830 tons; nonmechanized plants, 7,220 tons. (Note: a previous estimate was about 22,000 tons on hand in the Mocamedes area alone in July of this year).

The drop in the production of fish oils for the January-March 1960 quarter as compared with the first quarter of 1959 was not so sharp (1,073 metric tons as compared to 1,258 tons). Total production of fish oils in 1959 amounted to 4,857 tons, valued at US$647,000.

Prices and Costs: Small horse mackerel (carapau or Trachurus sp.), mackerel (cavala), sardines (Sardinha bigueirao), and "colo-colo" are the main fish species now being used to make fish meal and oil. The prices paid for these species have varied between 0.20 and 0.35 escudos per kilo (about US$6.40-$10.80 a short ton).

The cost of producing fish meal in mechanized plants is now 3,210 escudos (US$111.46) per metric ton at Mocamedes and between 2,713.20 and 2,856.00 escudos (US$94.21-$99.17) per ton at Benguela. The cost in nonmechanized factories at Benguela is between 2,427.60 and 2,713.20 escudos (US$84.29-94.21) per ton. No cost figures are available for the nonmechanized fish-meal plants at Mocamedes, but they are believed to be about the same as those of Benguela. Costs at nonmechanized plants are said to be less than those of the mechanized factories when, as now, the decreased fish catch does not permit mechanized factories to run at economic rates of production. The cost of production of fish oil at the present time is 965 escudos (US$33.51) per metric ton.

There are no fish-meal plants under construction at the present time. The industry's preoccupation has been with the reorganization of existing facilities and not with constructing new factories.

According to the Federation, the latest July export prices of fish meal have fluctuated between 2,284.40 and 2,427.60 escudos (US$79.32-84.29) a ton. (United States Consulate, Luanda, August 10, 1960.)

Australia

CANNERY PLANS TO INCREASE CANNED TUNA PACK:

An Australian fish-canning firm is going ahead with an extensive program to increase its pack of canned tuna. In a report on the company's activities, the chairman of directors stated that the company's fish canneries at Eden and Narooma have completed another successful year.

Over 3,000 metric tons of fish were processed and marketed by the canning company. Fishermen enjoyed a stable outlet for their fish with a fixed price throughout the year even though catches at some periods were of glut proportions. Last season the company reports it handled 500 tons of tuna alone.

To increase efficiency and expand production, an extensive expansion program involving the immediate expenditure of £100,000 (US$224,600) is in progress at the Eden cannery.

New-type refrigeration machinery has been installed for the purpose of freezing fish more quickly.

Capacity of refrigerated holding tanks has been greatly increased, factory space has been extended, and new canning equipment is being added. This will also assist the stated desire of the Australian Government to reduce imports of canned fish.

As the size and number of fishing vessels continue to increase, this should insure a

Table 1 - Angola's Production of Fish Meal and Oil, 1959 and January-March 1960

Item	Jan.-Mar. 1960			Jan.-Mar. 1959			Year 1959		
	Quantity	Value		Quantity	Value		Quantity	Value	
	Metric Tons	1,000 Escudos	US$ 1,000	Metric Tons	1,000 Escudos	US$ 1,000	Metric Tons	1,000 Escudos	US$ 1,000
Fish meal	3,465	10,903	378	18,401	77,275	2,684	56,170	177,270	6,155
Fish oil	1,073	3,693	128	1,258	4,516	157	4,857	18,631	647
$ per short ton	-	-	109	-	-	146	-	-	110

Australia (Contd.):

greater fish catch during the next 12 months.

Export of frozen tuna from New South Wales to the United States is not considered opportune. The United States is a big buyer of frozen tuna and considerable dollar earnings for Australia could be obtained from this product. But the large capital cost of additional freezing and holding equipment which would be idle for a great part of the year makes the operation unattractive.

South Australia has been able to export to the United States because of the availability of extensive freezing equipment owned by the Government Meat Exporting Works at Port Lincoln, which would otherwise be out of use at the time tuna is caught in that area. This equipment, made available on a rental basis, is not available in New South Wales.

Competition from cheaper Japanese canned fish is an ever-present threat and application for tariff protection is in process. (Australian Fish Trades Review, July 1960.)

* * * * *

TUNA TAGGING EXPERIMENTS SEEK TO DETERMINE MIGRATIONS:

Tagging of southern bluefin and yellowfin tuna and of albacore tuna was commenced off Eden on the south coast of New South Wales in October 1957 by Australia's Division of Fisheries and Oceanography. The objects of this tagging were to determine seasonal migration, the rate of growth, and the homogeneity of the stocks being fished.

At first an experimental tag was used consisting of a strip silver dart-shaped head with an attached clear nylon tube containing the message, "Reward. CSIRO Cronulla Aust. Date Length Number." Of 464 of these tags attached to tuna, only one was recovered, so it was assumed that these tags were not satisfactory and they have now been superseded by a type of tag used successfully on tuna by United States biologists. A half arrow head made of nylon fits into a red nylex tube on which is printed, "Reward. CSIRO Cronulla Aust. Length Number."

Fish to be tagged are caught by trolling, the length from tip of snout to fork of tail is measured, and the tag is attached by inserting its head in the region just below the second dorsal fin where the barb holds firmly in the flesh, and the nylex tube protrudes and is thus easily seen by the fisherman who later catches the marked fish.

This tag was first used in Australia during the 1959 season when 77 of the old experimental-type tags were attached to 73 bluefin and four yellowfin tuna, and 168 of the United States type-tags were attached to 130 bluefin tuna, 35 yellowfin tuna, and 3 albacore tuna, during the period June 3, 1959, to April 12, 1960.

Four United States-type tags were recovered last season. Three of the recoveries show local movements over a period of 7 to 64 days. The fourth and most interesting recovery was made in South Australian waters about 50 miles south-west of Port Lincoln. The fish was free for 135 days and increased its length by 2.7 inches and its weight by 3 pounds.

Another interesting tag recovery during the 1959 season was made off Bermagui (New South Wales) in November. This tag was from a yellowfin tuna which had been caught and tagged from a Japanese fisheries research vessel in August 1959, about 50 miles east of Great Sandy Island, Queensland.

There is a 4 shilling (about 45 U. S. cents) reward for the return of a tuna tag with the information requested. (Australian Fisheries Newsletter, July 1960.)

Belgium

FISH MEAL AND MARINE-OIL INDUSTRY, 1959 AND FIRST QUARTER OF 1960:

Fish Meal: There are four fish-meal reduction plants operating in Belgium, with an estimated annual production of 6,000-10,000 metric tons. The bulk of the fish meal consumed in Belgium is imported and in 1959, 29,968 metric tons (valued at US$4,766,000) were imported. During the first three months of 1960 imports amounted to 15,391 tons, valued at US$1,899,000. Prices per short ton for imported fish meal declined sharply from a 1959 average of about $144 to about $112 for the first quarter of 1960. A further drop took place in April 1960, when the average price per short ton was about $100.80.

In 1959, Peru was the principal supplier of fish meal to Belgium, with 20,491 metric tons, or 68.4 percent of total imports, followed by Norway with 6,499 tons (21.7 percent). The balance of the 1959 fish-meal imports was supplied by Angola, Denmark, the Netherlands, and several other unidentified countries. During the first three months

Belgium (Contd.):

of 1960, Peru's share of the Belgium imports of fish meal rose to 91.7 percent (14,117 tons) and Norway's share dropped to 7.7 percent (1,183 tons). Those two countries supplied 99.4 percent of the January-March 1960 Belgium imports of fish meal. The January-March 1960 average price of fish-meal imports from Peru at $110 a short ton was down about 20.3 percent from the 1959 average price of $132 a short ton. The January-March 1960 average price for Norwegian fish-meal imports of $145 a short ton was 15.2 percent lower than the 1959 average of $171 a short ton.

Marine Oils: Belgium's requirements for crude and refined marine oils of all types are estimated at about 25,000 metric tons annually. In 1959, imports of crude and other marine oils amounted to 17,906 tons, valued at about $3,695,000. During the first quarter of 1960 marine oil imports totaled 2,608 metric tons, valued at $584,000. Average import prices per pound for crude marine oils during the first quarter of 1960 were up about 6.6 percent from the 1959 average. In April this year, the average price for imported crude marine oils increased to about 11.8 U.S. cents a pound, but this may be due to a higher proportion of the more expensive whale and herring oils and not an actual increase in the value of a particular crude oil.

A small quantity of Belgium's marine-oil production is exported principally to the Netherlands, West Germany, and France.

Marine oils are used in Belgium by refining into hardened fats (sulfonation), for the manufacture of certain types of inks and dyes, and some types of lubricating compounds.

Import Duties and Fees: There are no import duties or quantitative restrictions on imports of either fish meal or marine oils. A sales tax of 8 percent on fish meal and 5 percent on fish oil is assessed on both imported and domestic products. (United States Consulate, Antwerp, August 4, 1960.)

Table 1 - Belgian Imports of Fish Meal and Oil by Country of Origin, 1959 and January-March 1960

Item and Country	January-March 1960				1959			
	Qty.	Value		Average Price Per Short Ton	Qty.	Value		Average Price Per Short Ton
	Metric Tons	BF 1,000	US$ 1,000	US$	Metric Tons	BF 1,000	US$ 1,000	US$
Fish Meal:								
Peru	14,117	84,935	1,703	110	20,491	155,925	3,120	138
Norway	1,183	9,413	189	145	6,499	60,967	1,220	171
Angola	-	-	-	-	967	7,362	147	138
Denmark	-	-	-	-	903	7,512	150	147
Netherlands	-	-	-	-	500	2,212	44	101
Other Countries	91	367	7	73	608	4,224	85	126
Total	15,391	94,715	1,899	112	29,968	238,201	4,766	144
				Average Price Per Pound U.S. Cents				Average Price Per Pound U.S. Cents
Fish Oil (crude):								
Japan	1,139	12,949	260	10.4	8,600	87,812	1,757	9.3
Netherlands	853	8,748	175	9.4	4,494	44,888	898	9.1
Falkland Islands	-	-	-	-	2,859	28,703	574	9.1
Other Countries	403	3,674	74	8.3	1,386	12,836	257	8.4
Total	2,395	25,371	509	9.7	17,339	174,239	3,486	9.1
Fish Oil (other than crude) 1/:								
Norway	93	1,171	23	11.5	283	2,923	58	9.4
Japan	40	1,258	25	28.4	113	4,946	99	39.6
Netherlands	43	459	9	10.0	70	955	19	12.5
France	-	-	-	-	36	760	15	19.1
Other Countries	37	900	18	22.2	65	888	18	12.5
Total	213	3,788	75	16.2	567	10,472	209	16.8

1/Probably includes liver oils and other highly-refined oils.
Note: Values for January-March 1960 converted at rate of 49.86 Belgium francs = US$1.00.
Values for 1959 converted at rate of 49.98 Belgium francs = US$1.00.

Brazil

JAPANESE-BRAZILIAN TUNA FISHING COMPANY REORGANIZED:

The Japanese-Brazilian tuna fishing company operating out of Brazil has been reorganized. The Japanese firm has taken over 100 percent of the investment and changed the official prices of tuna. Through the change, the Japanese firm has obtained net proceeds of US$83,333 up to the present time, and yearly net proceeds of $194,444-$222,222 are thought to be assured.

The wholesale tuna price of the joint company was $188 a metric ton on the average, but the official price has been revised to $301 a ton ($377 at retail).

The set-up of the enterprise has been changed so that the entire investment of 45 million cruzeiros (about US$180,000) by the local interests became the Japanese firm's investment. The company is said to have filed a petition with the President of Brazil for tuna fishing licenses covering ten tuna vessels.

Yearly consumption of tuna in Brazil is said to be about 15,000 tons. There are prospects that the consumption will increase. (Suisan Tsushin, June 25, 1960.)

Canada

NEWFOUNDLAND FISH MEAL AND OIL INDUSTRY, 1958-59:

Fish-meal production in Newfoundland amounted to 9,787 short tons in 1958, and 9,464 tons in 1959. Production of fish oil amounted to 889,930 Imperial gallons in 1959.

As of August 1960, the price of fish meal produced in Newfoundland was C$81.00 (US$78.25) per ton (60 percent protein), or C$1.35 (US$1.30) per protein unit f.o.b. East Coast Canadian mainland ports. Fish oil was quoted at C$0.0825 (US$0.0796) per pound f.o.b. East Coast Canadian mainland ports.

The majority of freezing plants in Newfoundland operated their own meal reduction plants; most of the fish meal is made from fish waste originating from fish already paid for by the processing plant. Generally, no price is paid for small quantities of rejected fish used in meal production. In some instances, a price of C$8.00 (US$7.73) per ton has been paid for fish utilized in meal production. During 1959, fish-meal plants, specializing in the production of meal and oil, paid C$10.00 (US$9.66) per ton for fish waste. This year fish waste is being purchased at C$3.25 (US$3.14) a ton.

The cost of production is dependent on the volume of meal produced by a given plant. One of the largest producers of fish meal in Newfoundland has estimated costs at C$80.00 (US$77.28) per ton.

In 1958, 1,500 tons of fish solubles were produced, as compared with 1,800 tons in 1959.

Note: Values converted at rate of one Canadian dollar equals US$0.966.

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PROGRESS ON ATLANTIC COAST FISHERY STUDIES DISCUSSED AT MEETING:

Progress in fisheries science in both the biological and technological fields, particularly as to Canada's Atlantic coast fisheries, was reviewed and discussed in detail at the second "Open House" for the fishing industry conducted by the Fisheries Research Board of Canada at its Biological Station in St. John's, Newfoundland, in late June 1960.

Haddock Fishery: Canadian Biologist V. M. Hodder of the Newfoundland Station, in a review of Newfoundland's haddock fishery, said that interest in the species first developed during the war years and since then has become an important factor in Newfoundland's frozen fish industry. During the early years of the fishery, supplies were extremely good and a number of good brood years at periodic intervals continued to support the fishery at a high level until 1955. Since then, however, there has been a marked decline and scientific evidence indicates that the supply will continue to be comparatively low for some years to come.

At one time, Hodder said, the haddock catch ranked second in volume to that of cod in the Northwest Atlantic. However, the discovery and exploitation in recent years of new ocean perch grounds off Newfoundland's east coast has raised this species into second place.

He noted that there were marked differences in the growth of haddock in a number

Canada (Contd.):

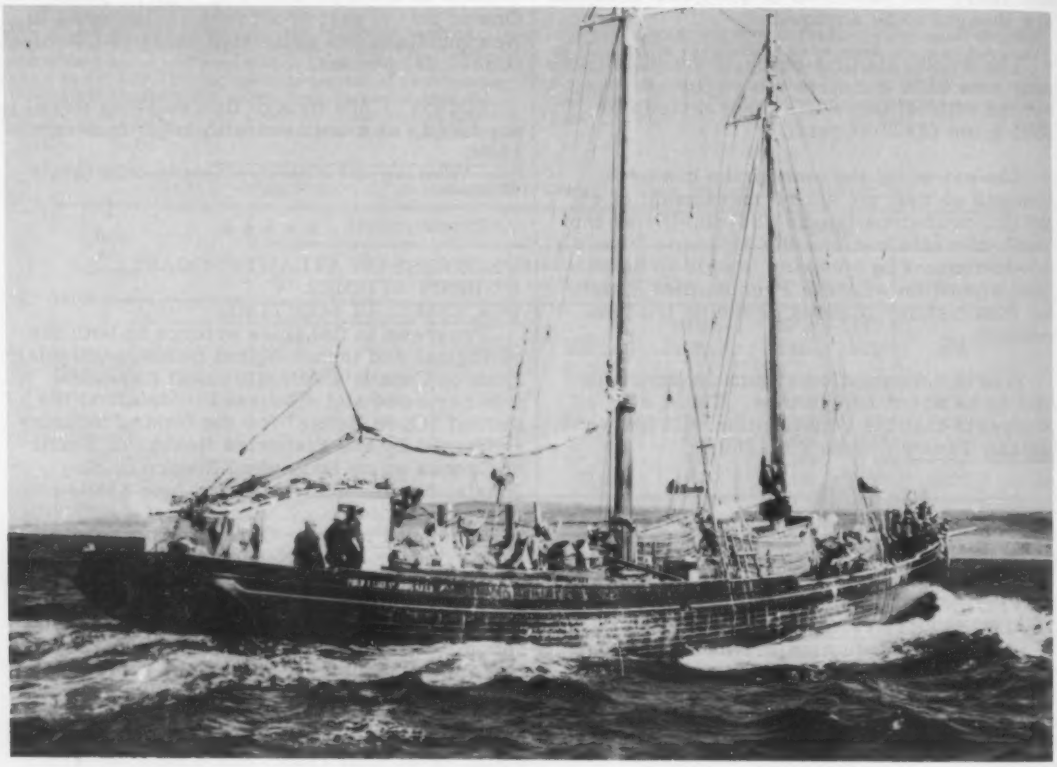
of Northwest Atlantic sectors. The Grand Bank stocks, for example, grow more slowly than those on the Nova Scotia grounds and on Georges Bank off the Gulf of Maine.

The biologist related various methods employed by scientists in determining abundance, growth rates, and other biological characteristics of the species and showed how the St. John's Station has developed these studies to the degree where the biologists can now predict how the fishery will fare a number of years ahead.

He also discussed the discarding of small fish at sea and how the use of different sizes of mesh in otter trawl nets could allow for the escape of these fish, thus giving a proportion of them the opportunity to grow larger and be caught another time.

Cod Fishery: A. M. Fleming, Assistant Director of the Newfoundland Station, stressed the importance of Newfoundlands inshore fishing operations.

He noted that in the Northwest Atlantic the annual cod catch amounts to two billion pounds, taken by 12 countries. Canada's landings total 800 million pounds; followed by Portugal which takes half that quantity, and Spain and France, which each accounts for 200 million pounds; other European countries together harvest 200 million pounds of cod.



Canadian east coast schooners, equipped with Diesel or gasoline engines, fish for cod and other groundfish. Fishermen use dories to catch fish with hook-and-lines. Sail is only auxiliary.

Fleming produced statistics to show that half the Canadian catch is taken from the waters off the east and south coasts of Newfoundland. . .the Grand Banks yielding the biggest production. Forty-four percent of the Canadian landings results from the inshore fishery. The biggest commercial fish-

Canada (Contd.):

ery in Newfoundland is carried on by inshore fishermen.

The speaker referred to the biological factors affecting the growth, reproduction and dispersal of the cod in and around Newfoundland waters. Vitally affecting the availability of cod, especially in east coast waters, was the Labrador current, which created a layer of cold water between two warmer ones. Taking into consideration such factors as the weather, not only during the fishing season but during the preceding winter as well, and other conditions, make it extremely difficult to predict with accuracy how good the fishing should be in any year.

Fleming pointed out that there were at least four races of cod in and around Newfoundland waters, and their growth rates varied considerably. Those on the Grand Banks grow the fastest and those of Labrador the slowest.

Ocean Perch Fishery: St. John's biologist E. J. Sandeman referred to the discovery of new grounds for ocean perch in the past few years. So prolific are those grounds that they are now yielding tremendous catches to the international fleet, particularly the U. S. S. R. and Iceland. Also, ocean perch have become the second most important species in terms of volume of landings in the entire Northwest Atlantic area.

Ocean perch were of no importance commercially in Newfoundland until the frozen fish industry came into being and then their value increased in relation to the expansion of processing facilities. Sandeman showed how extensive research and exploratory fishing by the St. John's biologists resulted in the discovery of a number of ocean perch areas around the Newfoundland coast, the Gulf of St. Lawrence, and even off the Labrador coast.

Sandeman outlined the years of research into the stocks of ocean perch in east coast waters. Dealing with some biological characteristics, he pointed out that it was a very slow-growing fish, that unlike cod and other groundfish species, the ocean perch produces living young and that it has a tendency to rise into the upper water layers during the hours of darkness. Thus the best fishing times are in broad daylight.

The new ocean perch grounds off Newfoundland's east coast extend from Flemish Cap many miles north, and being virgin territory are yielding very large catches. They represent an important contribution to the food supply provided by the Northwest Atlantic fishing grounds.

Lobster Fishery: Dr. D. G. Wilder, biologist in charge of lobster investigations at the Board's Biological Station in St. Andrews, N. B., described the lobster fishery as being very intensive and competitive. Canada's over-all landings, that is, the combined catch of the Maritime Provinces and Newfoundland, amount to about 48 million pounds a year, worth about C$18 million ex-vessel. Of that total, Newfoundland fishermen trap some 4 to 5 million pounds, valued at roughly C$1.3 million ex-vessel.

Wilder traced the history of the Canadian lobster fishery, showing how, after early years of plenitude, the lobster stocks declined drastically with the result that protective regulations became necessary to preserve the fishery. Principal Canadian regulations today are those governing open fishing seasons throughout the Atlantic region and prohibiting the keeping of undersized and egg-bearing lobsters.

Wilder traced the life history of the lobster dealing with the spawning, growth rate, and various environmental factors. He showed how fishing seasons affect the price of lobsters on the market, which in turn has a bearing on prices paid to fishermen.

Basically, the lobster is a nonmigratory animal. In the course of a year's wandering the lobster usually moves not more than a mile or two. As a result, the benefits of conservation are enjoyed by the area practicing it.

Illustrating the need for regulating the lobster fishery, Wilder said that the mortality rate among lobsters in the first couple of months of their life is 95 percent. The annual mortality rate in the adult population is 12 percent. The weight increase in a year ranges from 31 to 54 percent. It is the balance between survival rate and growth that supports size limits.

Referring to the strides that have been made in the holding and shipping of lobsters, the speaker noted that from coast to coast

Canada (Contd.):

artificial sea-water storage tanks are in use. Shipments by air, even to European markets, are made with a loss of only two percent. The largest tidal-water holding pound in the world is located in Charlotte County, New Brunswick. This pound has a capacity of 500,000 pounds and lobsters are held there for periods as long as six months. (Canadian Trade News, August 1960.)

* * * * *

STATUS OF BRITISH COLUMBIA EXPORT BAN ON FRESH AND FROZEN SALMON:

There is still an export ban on fresh and frozen coho or silver, sockeye, and pink salmon authorized by Section 10, subsections (4) and (5) of the British Columbia Fishery Regulations made under the Canada Fisheries Act by Order in Council of December 8, 1954 (Queen's Printer, Ottawa, 1958).

British Columbia gill-netter hauling in the net.

But there is no export ban on fresh and frozen spring or king and chum or fall salmon.

Fresh and frozen sockeye and pink salmon have been under continuous export ban since 1949. Fresh coho or silver salmon may not be exported after August 31 of each year. Prior to 1956, the export ban on fresh silver salmon applied during the whole year.

The reason for the export ban on the type and species of salmon mentioned is to encourage canning in Canada. During the record-breaking sockeye catch of 1958, exports of that species were permitted when Canadian canneries reached full capacity. (United States Embassy, Vancouver, September 8, 1960.)

Ceylon

TUNA FISHERIES:

There are at least six species of tuna in Ceylon Seas. Only one of them, the skipjack ("balaya") constitutes a distinct fishery, while the remaining species are taken with other types of fish in seasonal operations using many types of fishing lines and nets. The skipjack fishery is pursued vigorously off the south and west coasts from sailing outrigger canoes ("oru"). Fishermen carry live bait in

wicker baskets which are tied to the side of the canoe so as to keep their contents flushed with sea water as the canoe sails to the fishing grounds. Redbait "hingura" is the preferred bait fish, obtained from bays and other shallow coastal areas using cast nets.

When a school of skipjack is sighted, the canoe is steared into it and each man on board

Ceylon (Contd.):

begins to fish with pole and line. At first bait fish are attached to the hook for attracting the skipjack to bite; live bait are thrown into the school for keeping the fish near the canoe and to create excitement among the skipjack to bite unbaited hooks. Angling is continued until either the canoe is filled with the catch or the school moves out of range.

ther a silver-colored fish or an artificial lure, is joined to the end of the cotton line by a short length of wire. The fast-swimming tuna are attracted to bite the spinning bait, glistening in the brightly-lit upper layers of the sea. Large yellowfin tuna, sometimes weighing as much as 80 pounds, are caught with this gear by fishermen operating off the southwest coast (Negombo to Hambantota). Other kinds of fish taken by this gear are large sharks, spearfish

Typical craft and gear used in beach-seining operations in Ceylon.

Beach seines ("madal," "karavalai") which account for about 40 percent of Ceylon's fish production, encircle at times vast schools of mackerel tuna ("atavalla") and frigate mackerel ("ragudnva"). Fishing centers on the northwest coast, chiefly those between Udappu and Marawila, are reputed to make large catches, the fishermen there referring to both species as "balaii." Another area of importance for "balaii" landings is Trincomalee-Batticaloa. Success in obtaining a few large hauls of several thousands of these tuna enables the net owner not only to meet the entire season's operational costs but also to realize substantial profits. The profits will sometimes be large enough to help him to risk any losses during the next season on this relatively inefficient gear, limited as it is to fishing in coastal waters only.

Yellowfin tuna ("kelavalla") are obtained by trolling from sailing canoes. About 3 or 4 fishing lines are trailed behind as the canoe moves ahead. The hook, baited with ei-

("koppara"), sailfish ("thalapatha"), sier, and dolphin ("vannava").

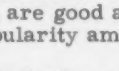
Hand-line fishing is another method used for catching large tuna from outrigger canoes. On reaching the fishing grounds in deep water just outside the continental shelf of the south coast, 3 or 4 fishermen on board lower the sail and hand line from the slowly-drifting canoe. Each hand line is quite long and both ends carry large hooks baited preferably with squid. The ends are paid out from the opposite sides of the canoe to hang down at different depths and the entire line is controlled by one fishermen. Yellowfin weighing as much as 200 pounds each are caught; more frequently these lines take large sharks.

Fishing with drift long lines was developed by the Japanese before World War II when exploring the Pacific and Indian Oceans for albacore and yellowfin tuna. They detected abundant resources of yellowfin in tropical seas especially near the Equator but at lower levels

Ceylon (Contd.):

as large tuna tended to avoid the brightly-illuminated surface layers by day. The use of long lines is being encouraged by the Department of Fisheries within its scheme of training local fishermen. This gear seeks to catch the deeper swimming tuna, while the established trolling and pole-and-line fishing methods are designed to catch those swimming near the sea surface. Baited hooks on short lengths of fishing line (branch lines) are fastened at intervals to a very long line which is lowered to a predetermined depth in the ocean by suspending it from floats. The entire gear is allowed to drift for a few hours in the currents before it is hauled back into the boat. Depths of 100-300 feet may be fished and the catch includes, besides tuna, spearfishes, swordfish ("kodnkoppara"), and large sharks. Results of long-line fishing from mechanized boats in offshore waters around Ceylon are good and this method is growing in popularity among local fishermen.

Ceylon's production of tuna in 1957 amounted to nearly 3,500 metric tons or about 9.5 percent of the total fish landings. In the Maldive Islands, a group of atolls situated about 450 miles west of Ceylon, the major industry is the preparation of a cured tuna product called "maldive fish." This is derived from a large skipjack fishery using live bait with pole and line from sailing boats, a method essentially similar to the one used in Ceylon waters. About 3,000 tons of Maldive fish are imported into Ceylon yearly. (Current Affairs Bulletin of Indo-Pacific Fisheries Council, April 1960.)



Chile

FISH MEAL AND OIL INDUSTRY, 1959:

According to latest official data (which are final), Chile's production of fish meal was 30,673 metric tons in 1959 and 18,779 metric tons the preceding year. This substantial increase (63 percent) in meal production is explained in large part by increased fish catches in 1958 and 1959.

The current price paid for fish (anchovies, sardines and hake) used in fish-meal reduction is about US$7 per ton and the estimated production cost of fish meal is US$80 per ton; whereas, the price in the international market is about US$60. Therefore, Chilean producers are operating at a loss of approximately US$20 per ton. The difference is made up by the Government in the form of an export subsidy of approximately 40 percent.

Twenty-nine fish-meal reduction plants are presently operating in Chile, and nine additional plants are anticipated.

At present, annual production capacity is approximately 80,000 tons and it is estimated that with the construction of the 9 additional plants, capacity will increase to 100,000 tons.

The latest available fish-meal export price in 1959 was US$120 and in 1960 US$60 to $80 per ton.

Exports of fish meal in 1959 amounted to 13,650 metric tons. In the preceding year, exports were 9,373 metric tons.

Table 1 - Chile's Fish Meal Exports, 1959

Country of Destination	Metric Tons
Belgium	491
Bolivia	1
Germany	3,321
Netherlands	3,327
Mexico	300
United States	5,194
Venezuela	1,016
Total	13,650

The construction of a fish-meal plant which was being built in Quintero by the United Nations and the Chilean Government for production of fish flour for human consumption has been discontinued.

According to the Chile Ministry of Agriculture, fish oil production was 1,131 metric tons in 1959 and 719 metric tons in 1958. In addition, there were produced in each of those years an estimated 100 metric tons of "vitamin fish oil" which is used for medicinal purposes. A total of 58 tons of fish oil were exported in 1959--51 tons to Italy and 7 tons to the United States.

Since Chile has sufficient production of fish meal and fish oil, it is uneconomical to import. As a measure of protection to the fish-meal and fish-oil industry, those two products are subject to an import deposit of 1,500 percent for 90 days. (July 19 and Sep-

Chile (Contd.):

tember 2, 1960, Foreign Agriculture Service Report, Santiago.)

Costa Rica

SPINY LOBSTER CATCH INCREASED SHARPLY IN SEPTEMBER:

During 1959, the spiny lobster catch in Costa Rica was negligible. The outlook for 1960, however, appears very promising as the catch out of the Caribbean port of Limon during the first part of September was very good.

It is believed that hurricane "Donna" which swept through the Caribbean may have affected materially the ocean conditions and marine life in the Caribbean because never before has such a quantity of spiny lobsters been found off the Caribbean Coast of Costa Rica. As a result, numerous citizens of Limon were busy around-the-clock building additional traps. Reportedly, within a period of two weeks, approximately CR$10 million (US$1,785,000) was earned by citizens of Limon from the production and sale of spiny lobsters.

The spiny lobster "invasion" was reportedly discovered through a routine scientific investigation made by two United States scientists who are in Costa Rica in connection with the conservation of the giant sea turtle. A few sharks were caught, and the contents of shark stomachs revealed them glutted with spiny lobster. This news reached the fishing community of Limon and spread rapidly. It is understood that one company in Limon has approximately 300,000 pounds in its cold-storage plant available for export.

Fearful that the present rate of catch might do serious harm to the lobster industry, the Municipality of Limon has asked the Food and Agriculture Organization (FAO), which at the present time is assisting the shrimp industry of Puntarenas, to conduct a similar study on the spiny lobster industry at Limon. It is felt that necessary measures must be adopted as soon as possible to conserve the spiny lobster population. The interest of Limon in such a conservation program is understandable as a sustained supply of spiny lobsters would be of considerable economic value, the United States Embassy in San Jose reported on September 14, 1960.

Cuba

CLOSED SEASON ON OYSTERS LIFTED:

The closed season on oysters (Crassotrea rizophorae) which was put into effect May 12, 1960, was lifted September 1, 1960, by a resolution signed by the president of the National Fishery Institute, and published in the Official Gazette of September 2, 1960.

* * * * *

EXPORTS AND LANDINGS OF CERTAIN FISHERY PRODUCTS, 1959:

In 1959, Cuba exported a total of 6.5 million pounds of fishery products valued at US$5.7 million. The high dollar to pound ratio was due to the exportation of such high-priced items as spiny lobsters, shrimp, turtles, frogs, and sponges. The chief fishery products exported were shellfish with 3.3 million pounds valued at US$3.2 million.

Cuba's Exports of Fishery Products, 1959

Product	Quantity	Value
	1,000 Lbs.	US$1,000
Frozen:		
Fish	954	381
Crustaceans	3,285	3,234
Other	942	836
Total	5,181	4,451
Canned:		
Fish	771	463
Crustaceans	383	593
Total	1,154	1,056
Sponges	98	204
Other products	100	17
Grand Total	6,533	5,728

Among the many fishery products landed in Cuba in 1959 were 1.2 million pounds of tuna valued at US$133,345 ex-vessel; 4.0 million pounds of bonito valued at US$461,714; 14.2 million pounds of spiny lobster valued at US$2.5 million; and 3.2 million pounds of shrimp valued at US$765,702. (Mar y Pesca, August 1960.)

French South Pacific Territories

RESEARCH INDICATES GOOD TUNA FISHING POTENTIAL OFF SOUTH PACIFIC ISLANDS:

The commercial possibilities of tuna fishing in waters around French South Pacific territories are being tested by the research vessels of the French Institute of Oceania, Noumea, and U. S. Bureau of Commercial Fisheries Honolulu Biological Laboratory research vessels. From the combined data, it is now possible to draw practical conclusions of considerable importance for the eventual development of tuna fishing in these areas. Exploratory fishing undertaken by Orsom III and the vessels operated by the Honolulu Laboratory of the U. S. Bureau of Commercial Fisheries has been accompanied by intensive studies in oceanography and hydrology. The data thus obtained has been supplemented by reports received from Japanese fishing companies operating in the South Pacific region. Practical fishing trials with local long-lines showed considerable promise and the results compared favorably with other regions. In the New Caledonia area in January and May 1959, the maximum catch was 5 fish per 100 hooks with an average of 3 per 100 hooks. The average weight of the fish was 80 pounds.

As a result of the investigations so far conducted, it appears that around New Caledonia and Dependencies and around the Condominium of the New Hebrides, fishing for skipjack and yellowfin tuna and Spanish mackerel can be carried out on a small scale with trolling gear. Some of these and other species may be taken on a commercial basis with long lines. Around the islands of French Polynesia, tuna fishing with live bait is sound commercial practice.

The data so far collected emphasize the very great importance of the scientific research work carried out from the territories. Such results as are already available have indicated which are the best methods to be used according to the type of fishing intended, whether small-scale or commercial, and provide information concerning the species of fish and rate of yield, which will be of use for eventual commercial development. (SPC Quarterly Bulletin, October 1959.)

German Federal Republic

FISH MEAL AND OIL INDUSTRY, 1958-59:

Fish-meal producers in the German Federal Republic have become greatly alarmed by the recent world-wide developments in the fish-meal market. The price slump has devaluated its stocks and the industry claims that not only has it already incurred considerable losses but that it is currently operating in the red. The industry attributes these unfavorable developments to sharply increased exports of fish meal from Peru, at prices which they say they cannot meet. The industry is further disturbed by reports that Peru is planning to step up its exports in 1960 and 1961.

Table 1 - Prices of Whole Fish for Reduction, German Federal Republic, 1958-59 1/

Species	Annual Average Prices			
	1959		1958	
	DM Per Metric Ton	US$ Per Metric Ton	DM Per Metric Ton	US$ Per Metric Ton
Herring	153.59	37	172.34	41
Cod	88.33	21	136.42	32
Haddock	110.62	26	122.82	29
Coalfish	122.51	29	143.70	34
Ocean perch	126.61	30	134.87	32
Mackerel	150.21	36	143.43	34
Sprats	127.51	30	132.99	32
Sand launce	113.02	27	108.55	26
Feed shrimp 1/	120.82	29	111.24	26
Starfish 1/	47.67	11	47.74	11
All other species	88.92	21	49.83	12

1/ Includes feed shrimp and starfish which are dried and ground for an admixture in cattle feed; they are not used in production of fish meal.
Note: Values converted at the rate of one Deutsche Mark equals US$0.238 (4.20 Deutsche Marks equal US$1.00).

Fish-meal producers have tried several approaches to bar Peruvian fish meal from the German market. They have pointed out that German fish meal contains from 90-96 percent digestible protein, while Peruvian meal contains only 50-85 percent and averages much closer to 50 than 85 percent. However, requests from the fish-meal industry that the Federal Government establish a minimum rate of 90-percent digestible protein have failed because existing legislation does not permit such obligatory requirements.

The industry has also asserted that the Peruvian fish-meal industry uses "formalin" in its production, and that the chemical leaves a residue of formaldehyde in the final product. Laboratory findings have not substantiated this.

Importation of fish meal into the German Federal Republic is at present completely liberalized. In early 1960, the Government abolished export controls on fish meal. Non-purified edible fish body oil may be imported free of any quantitative restrictions. However, Government import licenses are required for purified edible fish-body oil, which comes within the purview of the marketing law. Imports of nonedible fish oil have been liberalized.

The industry has requested the Federal Government to deliberalize fish-meal imports and/or to introduce protective tariff rates. Apparently, these proposals have not been received with sympathy by the Government, and the industry claims that the Government's position is influenced politically by the farmers who, the industry claims, are saving about DM120 million (US$28,560,000) per year on feed costs as a result of the drop in fish-meal prices. Government officials, both on the federal and state level, have confirmed that there is little likelihood of deliberalization or protective tariff measures.

One of the most recent proposals being discussed involves the application of an import levy to fish meal which

German Federal Republic (Contd.):

would be similar to the levy on grain. The industry has suggested a levy by the Federal Government which would raise the price of imported fish meal to the levels which prevailed before the breakdown of the market. No figures have been mentioned, but by this criterion the price of fish meal would be raised again to about DM750 (US$178) per metric ton. While various officials are skeptical about the prospects of an import levy, they point to recent assurances from other officials that at least some steps will be undertaken in the future.

Peruvian fish-body oil for the margarine industry at a price of about DM 520 a metric ton (about 5.6 U. S. cents a pound). As of August 2, 1960, imported Peruvian fish-body oil with 0.2 percent free fatty acids was priced at DM 547.50 a metric ton (5.9 cents a pound) and with 3 percent free fatty acids at DM 475 a metric ton (5.1 cents a pound), c.i.f. West German seaport.

According to the Fischereihafen-Betriebsgesellschaft (Fishery Port Operations Organization), Bremerhaven, the West German reduction industry was paying on July 29, 1960, the following prices for whole fish: whitefish, DM 43 (US$10) a metric ton; ocean perch, DM 65 ($15); and herring, DM 90 ($21) a metric ton.

As of August 3, 1960, the price for whole herring was to be reduced to DM 85 ($20) per ton.

Prices for fish offal or waste from fish processing and filleting (which represents about 60 percent of the total raw material used by the reduction industry) are only slightly lower than whole fish for reduction.

Table 2 - Prices for Fish Waste in German Federal Republic

Type of Waste	July 29, 1960		Mar. 1, 1960		Dec. 3, 1959		Sept. 21, 1959	
	DM Per Metric Ton	US$ Per Metric Ton	DM Per Metric Ton	US$ Per Metric Ton	DM Per Metric Ton	US$ Per Metric Ton	DM Per Metric Ton	US$ Per Metric Ton
Whitefish	28	7	60	14	80	19	90	21
Ocean perch	50	12	75	18	100	24	120	29
Herring	75	18	80	19	100	24	125	30

A West German fish-meal manufacturer stated that the members of the International Association of Fish Meal Manufacturers recently discussed the possibility of establishing a world-wide fish-meal production and distribution agreement, patterned after the international agreements on coffee and wheat. In considering such an agreement, it was estimated that West Germany's annual fish-meal demand would be about 240,000-250,000 metric tons, of which about 160,000 tons would be imported (100,000 tons from Peru).

It was reported that a West German importer in June or July 1960 signed a contract to import about 25,000 tons of

Table 3 - Import Prices as of July 29, 1960, for Fish Meal in German Federal Republic

Country and Specification	Prices	
	DM/Metric Ton	US$/Metric Ton
Peruvian fish meal, 65-70 percent (ex railroad West German seaport, for delivery until July 1961)	360	89-90
Angola fish meal (c. & f. West German seaport)	407.50	97
South African fish meal (c. & f. West German seaport)	482.50	115
Icelandic cod meal (" " " " " ")	600-625	143-149
Newfoundland cod meal (" " " " " ")	595	142
Japanese " " (" " " " " ")	540	129

Note: (1) As of July 29, 1960, West German fish meal was quoted at DM 485 ($115) per metric ton f.o.b. factory, and West German cod meal DM 577.50 ($137) per metric ton f.o.b. factory.
(2) Source: Bremen Association of Grain and Feed Importers and Wholesalers.

Table 4 - German Federal Republic Import Tariff Rates for Fish Meal and Oil

Product	EEC 1/	All Other Countries	CTT 2/
Fish meal	free	free	4%
Fish-liver oil of Gadus species (cod, haddock, coalfish, etc.):			
(a) raw	free	free	free
(b) mechanically purified	6%	8%	4%
(c) other	8%	10%	4%
Fish-body oil:			
(a) with more than 50 percent free fatty acid	3%	4%	4%
(b) with less then 50 percent free fatty acid 3/	free	free	free

1/ European Economic Community tariff rates as of July 1, 1960.
2/ CTT - Compensatory Turnover Tax, levied when there is a domestic Federal sales tax.
3/ Imports subject to marketing law.

German Federal Republic (Contd.):

On August 3, 1960, the price for herring offal was to be reduced by the fish-meal plants to DM 70 ($16.67) a metric ton.

Leading West German manufacturers have stated that the average production cost per metric ton of fish meal fluctuates between DM 280 and DM 330 (US$67 and US$79), the average being about DM 300 (US$71) a ton. These figures include wages, fuel, maintenance and write-off of equipment, packing, sales tax, the manufacturer's profit margin, etc., but do not include the cost of the raw material.

Fish-meal exports from the German Federal Republic have ceased completely because of the inroads made by Peruvian fish meal in the world market. German exporters have reportedly offered their fish meal abroad at prices about 10-15 percent above Peruvian prices, but without success.

Apparently the German fish meal and oil industry is not receiving any kind of Government aid; some aid may be extended to the fishing industry.

Local trade sources point out that the decline in prices paid by the reduction industry for raw material has reduced the income of the fishing industry, fish processors, and fish dealers by some DM 24 million (US$5,474,000) during the past twelve months. The fishing trade has already made presentations concerning the deterioration of its financial position to the Federal Government and to the governments of the coastal states. While the payment of direct subsidies to the fishing industry has been rejected by public authorities, no decisions have yet been made concerning other kinds of support, such as deferment of the amortization of government loans, the granting of additional low-interest government loans, etc.

Greece

ATLANTIC OCEAN TRAWL FISHERY EXPANSION CONTINUES:

On the occasion of a trial trip of the freezer trawler Evridiki II, the Greek Minister for Industry and Marine Commerce praised the vessel owner for the efforts put forth in the Atlantic Ocean trawl fishery. He said, in a report in the August issue of Aleia, a Greek fishery periodical, that in the eight years since the first trip to the Atlantic banks the Greek freezer-trawler fleet had grown to 14 vessels of which 9 already were in operation. The Greek Government's support of the operation totaled more than US$4 million while the industry had contributed $6 million. The production of the operating vessels was about 10,000 metric tons, but was expected to increase to 16,000 tons next year when the vessels under construction came into operation.

Greek fish production in the Mediterranean and other waters has been increased with Government support and totals 80,000 tons.

Fish consumption per capita in Greece was said to be 13 kilograms (about 28.7 pounds) per year.

The only Greek freezer stern-trawling factoryship, the Evangelistria IV, has returned from her first trip with a catch of 485 metric tons of frozen fish. The new vessel, which incorporates changes from the usual construction of such vessels, performed well. Production averaged more than 12 tons daily on the banks off Northwest Africa and is expected to increase on the next trip. Its operation has demonstrated that the mechanical and construction changes were carefully developed and carried out. (Fiskets Gang, September 1, 1960.)

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FIVE-YEAR PLAN INCLUDES US$5 MILLION FOR FISHERIES:

The Greek Economic Development Program (1960-64) provides 150 million drachmas (US$5 million at exchange rate of 30 drachmas equal US$1) for fish processing and freezing plants, fish hatcheries, fisheries research, and other projects. The 5-year program budgets US$2.3 million for fish processing and freezing plants at the following ports: Piraeus, $367,000; Thessaloniki, $533,000; Patras (under construction), $233,000; Cavala, $267,000; Chalkis, $267,000; Volos, $233,000, plus $100,000 for a fish collecting and storage station on Lemnos Island, and $333,000 for a wholesale fish market at Athens. In addition, the plan provides $1,000,000 for fish hatcheries, $667,000 for fisheries research, and $1,000,000 for various smaller fisheries projects. (United States Embassy, Athens, August 1, 1960.)

Iceland

CANNED SARDINES TO BE SHIPPED TO CZECHOSLOVAKIA:

A canning factory at Akureyri, Iceland, which recently increased its canning capacity considerably (present capacity 35,000 cans daily), has concluded a contract with Czechoslovakia to deliver one million cans of sardines by December 31, 1960. (United States Embassy, Reykjavik, September 2, 1960.)

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Iceland (Contd.):

FISHERIES TRENDS, FIRST QUARTER 1960:

The 1959/60 winter fishing season was more favorable even than the two good previous winters. The value of the first quarter 1960 catch was considerably greater than that of the first quarter of 1959 due not only to the larger weight landed but also to the predominence of the more valuable cod and haddock. The over-all catch during the first quarter of 1960 was substantially larger--129,355 metric tons as compared with 110,363 metric tons for the first quarter of 1959. On the other hand, the ocean perch catch, most of which goes to the Soviet Union, was only a fourth as large as for the first quarter of 1959.

Table 1 - Iceland's Fishery Landings by Principal Species, January-March 1958-60

Species	January - March		
	1960	1959	1958
	(Metric Tons1/)		
Cod	94,720	74,566	85,673
Haddock	13,195	8,424	10,543
Saithe	2,709	2,785	3,032
Ling	2,874	1,171	2,268
Catfish	4,232	3,304	5,121
Cusk	4,763	2,061	3,615
Ocean perch	4,271	16,667	4,792
Flounders	685	426	551
Herring	900	102	1,422
Other	1,006	857	907
Total	129,355	110,363	117,924

1/Weights are gutted fish with heads on, except herring which are whole or round.

higher income from working on the smaller fishing vessels. As a result, a number of trawlers, particularly the older ones, were laid up at the start of the season.

Incidents with British trawlers occurred during the first quarter of 1960. The Icelandic authorities accused a British trawler of deliberately destroying nets of Icelandic fishing vessels off the Snaefellsnes peninsula.

A very important trend toward free markets is noticeable in the first quarter fish export figures for 1960 as compared with the first quarter of 1959. For the latter period, 60 percent of the catch had been delivered to the filleting and freezing plants and only 33 percent was salted or dried. During the first three months of 1960, some 52 percent went for freezing, while salted and dried fish rose to 39 percent. During 1959, Iceland had been unable to meet all export demand for salted and dried fish. This demand comes exclusively from free currency markets whereas much of the frozen fish goes to the Soviet Union.

There was a considerable build-up in both the trawler and smaller fishing vessel components of the Icelandic fishing

Table 2 - Iceland's Fishery Catch by Type of Vessels, January-March 1958-60

Species	January-March		
	1960	1959	1958
	(Metric Tons1/)		
Motorboats	107,243	75,724	84,625
Trawlers	22,112	34,639	33,299
Total	129,355	110,363	117,924

1/All weights are of gutted fish with heads on, except herring which are whole.

Trimming and packing fillets in an Icelandic fish-processing plant.

The 12-mile limit established September 1, 1958, for trawling operations had an adverse effect on catches of Icelandic trawlers as compared with those of motor boats. The relatively poor showing of the trawlers was also due to the difficulty of finding ocean perch off Newfoundland and Greenland as compared with the first quarter of 1959. However, exports of fresh fish on ice to England continued to flourish, and this somewhat strengthened the position of the trawlers.

Another difficulty for the Icelandic trawlers was a shortage of manpower due to: (1) the failure to reach agreement with the leader of the Faroese Seamen's Union as to terms for Faroese seamen, who normally serve on Icelandic trawlers during the February-May season; and (2) the relatively fleet during the quarter. One unit added was the most modern type of trawler operated by Icelandic owners. (United States Embassy, Reykjavik, August 25, 1960.)

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FLATFISH AIR DELIVERIES TO BRITAIN STEPPED UP:

The Icelandic fishing industry stepped up the use of newly-opened flatfish grounds this summer in connection with the newly-instituted delivery by air of flatfish to Great Brit-

Iceland (Contd.):

ain and other parts of Western Europe, according to a mid-August 1960 report. By early August the areas within the 12-mile limit opened for drag-net flatfish fishing were extended beyond the Westman Islands area. With easier access to Reykjavik and its airport, it is planned to step up flatfish air shipments to Great Britain to 50 tons of fresh flatfish each week. A DC-4 carries seven tons of fish to Great Britain at a cost of 7 Icelandic kronur per kilogram (8.4 U.S. cents a pound). Fruit and vegetables are brought back on return flights.

A limiting factor is the lack of available aircraft in Iceland. Although there may be some possibility of obtaining British cargo planes, a German DC-4 has been chartered. Discussions took place recently in Reykjavik regarding the formation of an Icelandic air-cargo company to transport fish and other freight. This would be a subsidiary of the two existing airlines. Although capital is said to be available for such a company, some doubts have been expressed that a sufficient year-round volume of potential air cargo would be generated in Iceland to make it worthwhile.

This new venture has stimulated a general increase in interest in ways and means of increasing exports of fish. The possibilities of making flatfish shipments by air to the United States were examined, but profit margins were not believed to be sufficiently large.

Transportation remains the chief bottleneck to Iceland's filling British market demands for flatfish. Air transportation is still unable to meet the earlier British requirements for 50 metric tons of flatfish weekly. This demand was reported at 260 tons of flatfish weekly by air.

Shipping of flatfish by air to England and other European points began to fall off after the first week in September due principally to the failure to find profitable return cargoes for the chartered planes. Fruit brought back on these flights met customer resistance due to high prices.

Flatfish shipments by vessel to England and other European countries are continuing. English experts are instructing employees in a number of Icelandic freezing plants to fillet flatfish for the frozen fish trade.

(United States Embassy in Reykjavik, August 23, September 2 and 16, 1960.)

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NORTH COAST HERRING FISHING SEASON POOR:

Compared with last year's good north coast herring season, the Icelandic 1960 season has been poor. By August 14, 1960, 103,956 metric tons had been landed as compared with 127,537 tons for the same period last year. The portion of the catch being salted is even more unfavorable: 16,940 tons, compared with 27,163 tons for the same period of 1959. Salt herring contracts call for delivery of approximately 36,000 tons this year, and the season, according to a mid-August report, had only a few weeks to go. The lion's share of the catch went for meal and oil, but those products are being sold on world markets in very small amounts due to depressed world price conditions. Some of the inferior meal has been sold for fox feed.

On August 27, 1960, search operations for herring were ended off the north coast of Iceland as a result of a very poor season. Last year herring spotting stopped September 9. By August 29, only 126,417 barrels of herring had been salted as compared with 216,307 barrels at the same time last year. Contracts have been signed for 270,000 barrels.

This coming winter the Herring Production Board will try out new packing methods on the south coast herring in an attempt to meet specifications for the United States market.

The reduction in world prices for fish meal and oil is estimated to be the equivalent of an 8-percent reduction in Iceland's normal export earnings.

The relatively poor north coast herring season has hit fishing boat owners particularly hard due to the exceptionally heavy investments made this year for new fishing gear and fishing boats.

Icelandic newspapers reported that over 100 Soviet herring vessels were fishing off Iceland's north coast. Some of those vessels were reportedly close to or possibly even within the 12-mile fishing limit.

Iceland (Contd.):

The ocean-perch fisheries have almost come to a halt as of mid-August 1960 due to a scarcity of fish on the Newfoundland grounds and off Greenland. (United States Embassy Reykjavik, August 23 and September 2, 1960.)

Iran

SHRIMP FISHING FLEET IN PERSIAN GULF TO BE INCREASED:

According to an August 23, 1960, report from Tel Aviv, Israel, two fishing vessels are being fitted out in Haifa to participate in the Iranian Gulf of Persia shrimp fishery. The names of the vessels are Nitzan and the Leamchav. Each vessel is 83 feet in length and displaces 250 tons. Upon completion of the fitting-out period in Haifa, the two vessels will make the voyage to Iran by going around the African Continent. Present planning calls for four months in transit. The vessels will fish for shrimp for a New York City firm that has been operating in the Persian Gulf for the past two years.

In addition, some vessels are also being sent overland from Haifa to Eilat. These vessels are about 60 feet in length. At least two of the vessels have been transported to Eilat and have sailed for an undisclosed port in Iran.

Italy

PRICE FOR JAPANESE FROZEN TUNA FIRMS UP:

Early in September 1960, the Italian frozen tuna market improved. Immediately after the abolition by the Japanese of the agreed export price of frozen tuna for Italy in mid-August, US$220 a metric ton c. & f. ($180 f.o.b. delivered at Dakar) was the price at which contracts were openly concluded. But early in September shipments to Italy were lighter and Italian buyers were paying $230 a ton c. & f. For delivery in October, large Japanese exporters claim that they are certain to be able to sell at $230 a ton.

The price on transshipped Atlantic Japanese tuna for the United States has also firmed up. In early September the price was $280-$290 a ton on albacore delivered at Cristobal. (Suisan Tsushin, September 9, 1960.)

Japan

FROZEN TUNA LICENSED FOR EXPORT TO EUROPE, FISCAL YEAR APRIL 1959-MARCH 1960:

During the Japanese fiscal year (April 1959-March 1960), 36,856 metric tons (valued at US$9,880,000) of frozen tuna were licensed for export to Europe. The destination of Japan's exports to Europe were as follows: Italy, 12,061 tons; Yugoslavia, 12,865 tons; France, 10,986 tons; and 944 tons to other European countries. The over-all value per ton of the frozen tuna licensed for export to Europe was about US$268.

Japan: Frozen Tuna Licensed for Export to Europe, April 1959-March 1960

Months	Country of Destination				Total Quantity	Country of Destination				Total Value
	Italy	France	Yugoslavia	Other		Italy	France	Yugoslavia	Other	
1959:	(Metric Tons)					(US$1,000)				
April	423	-	700	-	1,123	119	-	197	-	316
May	1,454	-	200	-	1,654	408	-	57	-	465
June	2,049	176	281	-	2,506	542	49	71	-	662
July	1,397	1,461	910	-	3,768	380	390	249	-	1,019
August	760	1,586	964	271	3,581	206	414	256	76	952
September	1,555	2,462	895	-	4,912	425	623	243	-	1,291
October	569	62	1,256	-	1,887	159	15	336	-	510
November	100	129	942	273	1,444	27	29	252	76	384
December	689	880	295	100	1,964	193	238	78	28	537
1960:										
January	407	1,462	1,346	-	3,215	110	381	358	-	849
February	1,446	1,623	1,831	-	4,900	387	377	508	-	1,272
March	1,212	1,145	3,245	300	5,902	335	312	890	86	1,623
Total	12,062	10,986	12,865	944	36,856	3,291	2,828	3,495	266	9,880

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CANNED TUNA IN OIL EXPORTS DROP:

According to the Japan Export Canned Tuna Manufacturers Association, the export of canned tuna in oil from April-July 1960 amounted only to 72,731 cases as against 337,724 cases for the same period last year.

Japan (Contd.):

Japanese Exports of Canned Tuna in Oil, April-July 1960

	April-July	
	1960	1959
	(Cases)	
Species:		
Albacore	26,300	124,278
Yellowfin	1,531	7,536
Big-eyed	7,041	103,220
Skipjack	30,215	80,348
Flakes	7,644	22,342
Total	72,731	337,724
Principal Destination:		
Germany	22,934	122,658
Canada	16,573	67,998
The Netherlands	8,635	27,721
United Kingdom	7,150	10,150
Switzerland	6,073	26,709
Belgium, etc.	5,678	22,042
Other Countries	5,688	60,446
Total	72,731	337,724

The drop is due to the poor catches of big-eyed tuna. The pack of canned tuna in oil has been light this year.

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CANNED TUNA IN BRINE EXPORT TRENDS:

The Japanese tuna packers association, as previously reported, suspended receiving canned tuna in brine from the packers for export to the United States as of September 11, 1960. For 1960 (April 1960-March 1961) the pack of canned tuna in brine for export to the United States was fixed at 2,300,000 cases (48 7-oz. cans), but cessation of packing from September 11 reduced the quota by some 500,000 cases. For the past few years, the canned tuna in brine pack has been 3,500,000 cases per year. By the end of each August about 1,000,000 cases had been shipped, but this year the shipments were considerably less. In July the price for canned tuna in brine f.o.b. Japan was cut $1 a case because sales were slow. By reducing exports, the industry hoped to stabilize the price.

The price difference between Japanese and United States canned tuna as of August 23 was as follows:

For United States tuna in oil, private label white meat, the price was $12-$12.50 a case (48 7-oz. cans) f.o.b. canners' terminal.

For Japanese tuna in brine, white meat, the price was $11.50-$12 a case (48 7-oz. cans) delivered to warehouse in Los Angeles.

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SHORTAGE OF CANNED LIGHTMEAT TUNA IN OIL REPORTED:

This year's Japanese skipjack tuna fishing as of the end of July 1960 was considered to be the worst in ten years and the pack of lightmeat tuna in oil for export to Europe was far short of its goal. On the other hand, lightmeat tuna in brine supplies exceed demand. It was estimated that the shortage for tuna in oil for June and July was 100,000-150,000 cases. Instead of asking for delayed shipment, the exporters were trying to settle by paying a penalty. This shows that the canners do not expect any further pack.

As of the beginning of August 1960, the prices of lightmeat (skipjack) tuna in oil in Japan were $6.11-$6.94 for the domestic market and $6.20-$6.30 a case f.o.b. for export. These prices were considerably higher than the usual market prices and since ex-vessel prices continued at more than $175 a ton for skipjack, the packers were reported losing money.

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CANNED-TUNA-IN-BRINE MARKET POOR:

Regarding the export sale of canned tuna in brine, the Japan Canned Foods Exporters Association's standing tuna sales committee met late in August and took up the proposals made by representatives of Japanese packers. The meeting accepted the proposal that shipments scheduled for August, the sixth sale of canned tuna to the United States, be postponed until September 15, 1960. But the meeting agreed not to disclose their views on the two other proposals of the packers, which were:

(1) The export quota to the United States must be attained and the exporters' side is requested to cooperate. As for the seventh sale, it is desired to come to a thorough understanding with the expression "not to be held until the United States market conditions are stabilized." (The exporters have been requesting the packers to agree that the seventh sale will not be carried out until requested by the New York branches of the exporters).

(2) The application period of the price guarantee clause is to be 60 days for shipments going to the east coast and 40 days (30 days after arrival in the United States) for those to the west coast of the United States.

This year's Japanese cannd tuna exports are extremely slow and up to August 1960, a total of 1,330,000 cases, some 630,000 cases of white meat and 700,000 cases of light meat, had been exported. Although 273,000 cases of the United States import quota at the lower rate of duty are left, the remainder Japan plans to export this year is 670,000 cases. This means there will be more canned tuna shipped to the United States in excess of the quota and subject to the higher duty than there was last year.

The Japanese industry points out that their canned tuna market situation is the worst since 1955 and to cope with the situation it is necessary to suspend sales and lower the price. The packers claim that prices have been reduced as much as possible and, as a matter of fact, there is hardly any profit at $9.15 a case on white meat. The exporters say that they are resigned to a loss and request that the packers cooperate with them, adding that the packers should see what can be done to promote more sales. At any rate, it is generally thought difficult to sell the agreed export quantity this year.

Japan (Contd.):

At an August 27 meeting of the tuna packers association it was agreed that:

(1) Packing of canned tuna will be stopped immediately and the quantity packed but not consigned will be reported until mid-September so that its consignment will be accepted. As a result, this year's receipts for consignment or sale will amount to some 1,740,000 cases, including the nonmembers' products, and some 540,000 cases of the production quota will not be produced.

(2) Next year's allocation of pack for canners will be based on this year's pack allocation plus 7 percent of the quantity used out of the free base quota.

(3) Agreed to postpone shipments for the sixth sale until September 15.

The packers want to sell the remainder of the United States import quota at the lower duty rate in two sales, one each in September and October.

Suspension of receipts from packers by the sales company is an unprecedented emergency measure. But with present market conditions and with stocks in the hands of the sales company in mid-August at 700,000 cases, the action was considered unavoidable.

In the first six allotments sold through mid-August, 1,580,000 cases of canned tuna were sold for export to the United States. Of that amount, as of August 10, 300,000 cases remained unshipped and 500,000 cases were estimated to be unsold and in stock in the United States. Taking these 800,000 cases into consideration, the actual quantity sold and delivered to buyers totaled only 800,000 cases.

Japan had planned to fill the 2,530,000 cases of the United States canned tuna in brine import quota at the lower duty with 2,200,000 cases of Japanese pack, but as of August 22 some observers thought that 1,800,000 cases of Japanese pack would be the maximum that could be exported to the United States.

The packers also have accepted the indefinite postponement of the sale no. 7 scheduled for August. The packers' association has also tentatively agreed that acceptance by the association of consignments from members scheduled in the third part of the market year--January-March 1961, amounting to 440,000 cases--should be suspended. (The Suisan Tsushin, August 22, 23, 25, 27; Fisheries Economic News, August 30, 1960.)

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FROZEN ALBACORE TUNA CHECK PRICE DROPS:

Following the drop in the ex-vessel price of albacore tuna in California, the Japanese in mid-August 1960 announced a lower check price of US$270 a short ton for frozen albacore tuna shipped from Japanese ports.

The check price for yellowfin tuna in mid-August was still $230 a short ton for direct shipments from Japan. (The Suisan Tsushin, August 23, 1960.)

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FROZEN YELLOWFIN TUNA PRICE FIXED FOR DIRECT EXPORTS:

At the Japan Export Frozen Tuna Manufacturers Association director's meeting on September 6, 1960, it was agreed that the conference price of direct exports from Japan of frozen yellowfin tuna after September 1960 should be set at $240 a short ton f.o.b. as a base. But a suggestion that the price among shippers of Atlantic yellowfin to Italy be set at $230 c. & f. was not approved.

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SEEK CONTROL OF FROZEN TUNA EXPORTS TO ITALY:

The Japan Federation of Skipjack Tuna Fisheries Co-ops and the Japanese Fisheries Agency have been studying the tuna market situation in Italy. Since the Fisheries Agency does not contemplate increasing the control of direct landings to Italy, the Federation has proposed certain controls for its member vessels operating in the Atlantic.

Due to modified control of exports to Italy in May, fishing in the Atlantic expanded. Due to increased landings, however, the landed price of frozen tuna at Italian ports has dropped as low as $100 a ton. Exporters in Japan are insisting on stricter controls on direct landings or transshipments of frozen tuna to Italy. (Fisheries Economic News, August 29, 1960.)

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PROPOSAL FOR SALES COMPANY TO HANDLE FROZEN ATLANTIC TUNA EXPORTS:

At a directors' meeting of the Japan Export Frozen Tuna Manufacurers Association on September 6, 1960, the sale of Japanese Atlantic-caught tuna to Europe and the United States via intermediate ports was discussed. One of the directors pointed out the need of selling all Atlantic tuna through the Japan Export Frozen Tuna Sales Co., Ltd., the same as tuna landed at Japanese ports and exported to the United States. A unanimous resolution was passed to the effect that sales of Atlantic tuna should be handled through the sales company in Japan, including a system of purchase and of consignment, and for as long as the directors deem necessary. This proposal was to be considered at a special general meeting on September 19, in order for it to become effective. It is hoped that if Atlantic-caught tuna is systematically allocated for United States, Italian, and Japanese ports through the sales company instead of the haphazard system now practiced that a certain amount of market stability would be achieved.

Japan (Contd.):

The proposal provides for shipping Japanese frozen Atlantic-caught tuna to Japan before it is exported to Europe and the United States. Atlantic tuna sales were confronted with a crisis when prices in the Italian market declined.

The Japanese Atlantic Tuna Liaison Committee, at a meeting, discussed methods of coping with the problem and discussed shipping the excess supply of Atlantic-caught tuna to Japan as well as the tuna not suitable for export. Any loss arising from this procedure would be proportionately shared by all the operating vessels in the Atlantic based on their usual production.

Assuming that about 5,000 metric tons are to be returned to Japan and calculating ex-vessel prices in Japan, operational expenses of the vessels and transportation charges, each operating vessel would be required to assume a charge of $3.61 a ton.

As outlined, the plan of the Atlantic Tuna Liaison Committee of the Export Frozen Tuna Manufacturers Association includes:

(1) Charter of a fleet of reefers jointly by fishing vessel-operating firms in order to bring to Japan such unsuitable species for export as bluefin as well as large yellowfin.

(2) Suspend departure of any new boat to the Atlantic Ocean for a specified time in order to prevent an increase of supplies.

(3) Build cold-storage warehouses in Atlantic ports which may be used freely by the Japanese, and establish an integrated joint selling, transportation, and accounting plan of the catch of Japanese fishing vessels operating in the Atlantic.

In the meantime, the authorities are informally requesting the industry to formulate a list of conference prices for Atlantic tuna at the same level as the prices for frozen yellowfin shipped to the United States from Japanese ports. (Various Japanese newspapers, August 29, September 7 and 8, 1960.)

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RESEARCH VESSEL TO EXPLORE FOR TUNA OFF WEST AFRICA:

The Japanese Fisheries Agency research vessel Shoyo Maru (603 tons) left on September 3, 1960, on a 6-months cruise off the west coast (10° N. lat.-10° S. lat.) of Africa in the Atlantic to locate good tuna fishing grounds and make various scientific studies including the evidence of "green meat tuna." The area is considered a potentially good one for Japanese fishermen.

Japan's tuna fishing vessels in the Atlantic, mostly fishing in waters off Latin America, number about 60. They produce annually about 50,000 metric tons of fishery products valued at about US$10 million in foreign currency.

While the Western Atlantic has been studied to some extent, very little is known of the fishery resources off the west African coast.

The Japanese research vessel carries a team of 47 fishery experts aboard. Experimental long-line fishing will be carried out in two areas: (1) 10° S. latitude-10° N. latitude and (2) 5° E. longitude-west of 20° W. longitude. The vessel will return to Tokyo in February 1961 after visiting various European fishery bases, including Las Palmas (Canary Islands), Venice, Italy, and a port in Yugoslavia. Also the vessel plans to study the tuna market situation in southern Europe.

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TUNA FISHING IN THE PACIFIC:

Kanagawa Prefecture Fisheries Experimental Station in August 1960 released the following forecasts on Pacific tuna fishing for September 1960 (tonnage indicates catch per 1,800 hooks):

West Pacific, the first fishing ground (north of 20° N. latitude, west of 180°): Big-eyed fishing will continue to be good in waters 30° N. latitude, 150°-180° E. longitude and around the Bonin Islands, yellowfin fishing is also good at rate of 0.5 ton. Also, from Okinodaitojima to 35°-43° N. latitude, 145°-170° E. longitude, catch of striped marlin which has been low for the past few years, is expected to continue at 0.3 ton. Broadbill swordfish will appear around 40° N. latitude, 150°-180° E. longitude and have a good fishing period at 0.6 ton. And schools east of the Izu Seven Islands will yield good catches at 0.4 ton.

West Pacific, the second fishing ground (5°-20° N. latitude, west of 170° E. longitude): In the sea area between the Palau Islands and Truk Island, yellowfin catch will noticeably decrease, compared with August, at 0.5 ton. A good fishing period for big-eyed tuna, an increase over August, at one ton.

West Pacific, third fishing ground (5° N. latitude-10° S. latitude, west of 170° E. longitude): Like August, yellowfin catch will be generally low. In the belt, 5° N. latitude-10° S. latitude, it is on the increase, heading for the good fishing period in the fall at 1.5 tons. In both east and west sea areas of the Solomon Islands, catch will be somewhat lower, at 1.3 tons, than north of 5° S. latitude.

West Pacific, fourth fishing ground (10°-30° S. latitude, west of 170° E. longitude): Being in a poor fishing period, yellowfin catch is low but along the Australian coast it is comparatively high, especially off Brisbane at 2.3 tons. Albacore catches, which were good in August, will be lighter

Japan (Contd.):

and the fishing area smaller. Rates of catch will be 0.9 ton along 24° S. latitude and 1.1 tons along 27° S. latitude.

Central Pacific, first fishing grounds (north of 20° N. latitude, 180°-150° W. longitude): Big-eyed tuna fishing will be steadily improving with good fishing 28°-32° N. latitude. Furthermore, this year happens to be a bumper year and catch rate will be 1.5 tons. Striped marlin season will be good at 0.2 ton.

Central Pacific, second fishing ground (5°-20° N. latitude, 170° E. longitude-150° W. longitude): Both yellowfin and big-eyed tuna will be poor in the sea area, 5°-13° N. latitude at 0.3 ton for yellowfin and one ton for big-eyed tuna. A good fishing period for black marlin is expected in the west of Palmyra Island at 0.4 ton and 0.5 ton on the east side.

Central Pacific, third fishing ground (5° N. latitude-10° S. latitude, 170° E. longitude-150° W. longitude): Although yellowfin fishing was good in August in the entire area, it is beginning to be on the decrease in September around the Phoenix Islands, east and south of the Gilbert Islands. It will be in a poor season south of the Gilbert Islands and around the Phoenix Islands at 1.1 tons for the former and 1.5 tons around the latter; at 1.9 tons north of the equator, north of the Phoenix Islands; 2.5 tons east of Christmas Island and 2.4 tons south. In the western part, 0.6 ton for big-eyed tuna and in the eastern part 0.5 ton. Black marlin catch rate will be 0.2 ton incidental to catching of other fish.

Central Pacific, fourth fishing ground (10°-30° S. latitude, 170° E. longitude-150° W. longitude): Continued good fishing for albacore will prevail between 22°-30° S. latitude at 1.5 tons. South of the Ellis Islands, it is expected to be 0.6 ton.

Central Pacific, fifth fishing ground (south of 30° S. latitude, 170° E. longitude-150° W. longitude): Tuna fishing off Australia north of New Zealand will be somewhat poorer than August at 4.2 tons. In waters 300 miles west of New Zealand and 180 miles northwest of the north cape of New Zealand, a catch rate of some five tons may be expected.

East Pacific, the first fishing ground (north of 20° N. latitude, east of 150° W. longitude): In the area 28°-32° N. latitude, 140°-150° E. longitude, big-eyed tuna fishing will begin to improve, approaching its winter good fishing season at 1.5 tons. Striped marlin will be in its good fishing period at 0.2 ton.

East Pacific, the second and third fishing grounds (20° N. latitude-10° S. latitude, east of 150° W. longitude): Of the area around 120°-150° E. longitude, the belt between 3°-10° N. latitude will yield poor yellowfin fishing at 0.9 ton. Big-eyed tuna will have its good season but conditions are somewhat different in the north and the south of 5° N. latitude at 5.1 tons for the north and 4.4 tons for waters between 3°-5° N. latitude or maybe less. In the area south of the equator, yellowfin fishing in two areas, the equator-2° S. latitude and 5°-10° S. latitude, will have either a good fishing period or will steadily improve at 3.6 tons for the equator-2° S. latitude and 1.8 tons for the area between 5° and 7° S. latitude. Also, 2.7 tons will be the catch rate for 7°-10° S. latitude and in the area, the equator-10° S. latitude, they are expected to be caught with big-eyed tuna whose catch rate is thought to be 3-4 tons.

East Pacific, fourth fishing ground (10°-30° S. latitude, east of 150° W. longitude): Albacore catch around 22° S. latitude will be low at 0.3-0.9 ton but like the fourth fishing ground in the Central Pacific, catch is expected to be higher in the south.

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TWO TUNA MOTHERSHIPS RETURN FROM FIJI ISLANDS AREA:

The Nojima Maru (8,503 tons), one of the tuna-fishing motherships operating in the Fiji Islands area, returned to its Japanese base on September 8.

This mothership and its fleet of vessels started fishing late in May and attained its catch quota of 5,466 metric tons 15 days earlier than expected due to unexpectedly good catches of yellowfin tuna. She returned to Japan with about 3,500 tons of the total catch, the balance having been shipped to Japan via carrier vessel. Included in the catch by the Nojima Maru's fleet were 1,400 tons of albacore and 1,285 tons of yellowfin tuna. The yellowfin tuna averaged close to 49 pounds per fish as compared with an average of 38 pounds per fish last year. One-third of the entire catch is to be exported.

A second tuna-fishing mothership, the No. 3 Tenyo Maru, arrived back in Tokyo on September 15 from a trip to the same Pacific area. Her fleet's catch amounted to 6,426 tons, including 2,395 tons of albacore and 2,364 tons of yellowfin tuna. The No. 3 Tenyo Maru was replaced on the Fiji Islands fishing grounds with the Koyo Maru on August 3.

Unusually good fishing was reported around mid-August 1960 by these Japanese mothership-type tuna long-line fleets fishing off the Fiji Islands in the South Pacific this season.

The Koyo Maru expected to operate until mid-November 1960, and produce 2,200 metric tons of frozen whole tuna and 2,400 tons of fillets, of which 1,700 tons was to be exported to the United States. (Fisheries Economic News, August 20; other Japanese newspapers of September 13-15, 1960.)

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SEPTEMBER FORECAST ISSUED FOR TUNA FISHING IN INDIAN OCEAN:

The Kanagawa Prefecture Fisheries Experimental Station early in August released forecasts on Indian Ocean tuna fishing in September 1960 as follows (tonnage indicates catch per 1,800 hooks):

Eastern Indian Ocean (east of 100° E. longitude): Yellowfin fishing in the Banda and Flores Seas will be poor with 0.3 ton. In adjacent waters of the Small Sunda Islands and around northwest shores of Australia, fishing will remain at 1.2 tons in the former and 1.5 tons in the latter. Big-eyed tuna fishing is expected to be good in the north of 23°

Japan (Contd.):

S. latitude at 2 tons. Good albacore fishing period is expected west of 110° E. longitude between 20°-30° S. latitude and 10°-13° S. latitude with increased catches of 1.3 tons over August. Indian Ocean tuna will appear from Timor Island to 20° S. latitude, 105° E. longitude and catch will increase suddenly to 2.2-3 tons.

North Indian Ocean (north of 5° N. latitude): Poor fishing for yellowfin and big-eyed tuna in the Bay of Bengal with 0.7 ton for yellowfin and 0.5 tons for big-eyed tuna. Also, poor yellowfin season is expected in the Arabian Sea with 0.7 tons, but big-eyed tuna fishing will be good with 3.6 tons perhaps.

Central Indian Ocean (5° N. latitude-10° S. latitude, west of 100° E. longitude): Yellowfin fishing will be generally poor with 1.6 tons in the eastern region and 2.7 tons in the western part. Big-eyed tuna are expected to be caught in the entire sea area mixed with other species at rate of 1.5 tons.

South Indian Ocean (south of 10° S. latitude, west of 100° E. longitude): Albacore season will be good in the sea area between 22°-30° S. latitude in the east of 52° E. longitude with 1.5 tons in the eastern area and 2.4 tons in the western part. Also, yellowfin will be mixed with other species in that area at rate of 0.8 ton.

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TUNA FISHING IN INDIAN OCEAN:

Tokai University's Fisheries Research Institute reported as of mid-August 1960 on fishing conditions in the Indian Ocean as follows:

Generally speaking, fishing in the middle and western Indian Ocean was somewhat inactive and there were only 26 vessels operating. Yellowfin fishing in Sumatra waters was showing a tendency to decline. Comparatively good fishing, however, was reported around 4°-5° S. latitude, 95°-98° E. longitude. Yellowfin and big-eyed tuna fishing was being started on the south side of the Sunda Islands. Albacore fishing continued good east of Madagascar, averaging 3.8 metric tons a day.

Principal fishing grounds for yellowfin, big-eyed, and albacore around Sumatra were shifting east southeastward. Fishing was good around 95°-98° E. longitude, 4°-5° S. latitude. The fishing ground around Madagascar at 50°-54° E. longitude, 26°-28° S. latitude shifted westward, and although catch decreased somewhat, fishing was rather stabilized. About 12 vessels were still operating in the area. The size of the albacore was about 40-51 pounds each, smaller than those caught farther south. (Fisheries Economic News, August 26, 1960.)

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CANNED SALMON SALES AND MARKET PROSPECTS THIS YEAR:

The Japanese Canned Salmon Joint Sales Company towards the latter part of August prepared to sell this year's pack of canned salmon for export. The amount available for export is expected to be about 40 percent less than last year. A 5 to 8 percent increase in price is expected to follow and the sales company expected a meeting of its directors to set the new prices for this season's pack.

The sales company would like to raise the price for export by 10 percent (the same as for domestic sales). But reports state that in Britain, canned salmon stocks are in excess of demand and export sales to that country are not expected to be handled as readily as domestic sales in Japan.

Pack receipts for sale by the sales company for 1960 are estimated to be some 1,300,000 cases (half-pound cans, 96 cans to a case)--a decrease of about 1,000,000 cases from last year's receipts.

Japanese Canned Salmon Joint Sales Company Sales, Fiscal Year April 1959-March 1960

Product	Carried Over from Previous Fiscal Year	Consigned to Sales Company During Year	Contracted	Remainder
	(Cases of 48 Half-Pound Cans)			
Red	4,350	584,900	589,250	0
Silver	3,000	115,590	118,590	0
Pink	108,550	1,388,000	1,420,850	75,700
Chum	18,450	156,450	174,900	0
Tidbits	2,400	69,950	66,550	5,800
Total	136,750	2,314,890	2,370,140	81,500

The sales company has compiled data on its sales in the fiscal year April 1959-March 1960 (see table). Of the 75,700 cases of pinks not contracted for as of March 31, 1,000 cases are fancy (96 cans of No. 2's); 38,000 cases are standard grade (96 cans of No. 2), 600 cases of 48 cans of No. 4's; 38,500 cases of 96 cans of No. 3 standard;

Japan (Contd.):

and 17,00 cases (96 cans of No. 3) in tomato sauce. (The Hokkai Suisan, May 23, 1960; Fisheries Economic News, August 23, 1960.)

Note: Can sizes are somewhat different from United States usage--No. 2 cans are half-pound cans and No. 4 cans are 1-lb. cans.

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CANNED SALMON EXPORT PRICES:

The Japanese Canned Salmon Sales Company announced early in September, this year's export prices for a case of 96 No. 2 cans of canned salmon--$1.30 a case higher

Japanese Canned Salmon Export Prices (f.o.b.), 1960

Type	Cans/ Case	For United States, Canada, Europe	
		New Price	Old Price
		(US$/Case)	
Red, #2 can	96	42.10	40.80
Red, #3 can	96	28.15	27.05
Silver, #2 can	96	32.70	31.40
Silver, #3 can	96	21.10	20.70
Pink, #2 can	96	20.80	19.80
Pink, #2 can	48	10.50	10.00
Pink, #3 can	96	12.50	10.00
Pink, #4 can	48	18.00	17.00
Chum, #2 can	96	18.30	17.30
Chum, #3 can	96	11.50	11.00
Chum, #4 can	48	16.50	16.00

Note: Can numbers are not the same as used in United States. No information of equivalent U. S. number of net contents for each can size.

for red and silver salmon and $1.00 higher on pink and chum salmon. (Suisan Tsushin, September 13, 1960.)

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SALMON MOTHERSHIP FLEETS TO FISH BOTTOMFISH IN BERING SEA:

Japanese companies are planning to send six of the salmon mothership fleets to the Bering Sea and North Pacific to fish for flatfish and bottomfish now that the salmon fishing season is ended.

To the Bering Sea: Ekjin Maru mothership with 12 trawlers for a production target of 4,720 metric tons; Miyajima Maru with 6 trawlers, target 5,600 tons; Kyokuzan Maru with 8 trawlers, production target 4,800 tons.

Sea areas west of Kamchatka Peninsula: Kashima Maru mothership with 10 catchers, target 6,500 tons; Chiyoo Maru, target 5,900 tons; Ohtus Maru, production goal of 5,000 tons.

The total production of the 6 fleets will amount to 32,520 tons. Adding frozen products produced by four other trawling factoryships operating in the North Pacific, total production is expected to exceed 40,000 tons this year. (Suisan Tsushin, August 23, 1960.)

Japanese trawler Kinyo Maru with deckload of flatfish caught in July 1960 in North Pacific.

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AQUICULTURAL PRODUCTION UP FOR 1959/60 FISCAL YEAR:

On July 25, 1960, the Japanese Statistics and Survey Section of the Ministry of Agriculture and Forestry published data on cultured pearl, laver, oyster, and other aquiculture production for the Japanese fiscal year April 1959-March 1960. There was a production of 54 metric tons of pearls, 24,000 tons of oysters (meats), and 2,290 million sheets of dried laver or seaweed--increases of 11 percent, 22 percent, and 9 percent, respectively, over the preceding fiscal year. These figures, which are the highest in history, show how aquiculture is taking the spotlight in the Japanese coastal fisheries.

Cultured Pearls: There were 5,548 producers of cultured pearls, an increase of 9 percent over the previous year. The number of enterprises raising oysters for pearl culture increased, but there was a declining trend in the number engaged both in raising the host oysters and culturing pearls. There was a decrease in the number of small operators with from one to 14 rafts, but increases among medium-size enterprises with 15 or more rafts, and large operators with 100 or more rafts. This tendency appeared strong in Mie, Kochi, and Nagasaki prefectures. The total quantity of pearls landed was 53.6 metric tons. Production of small pearls de-

Japan (Contd.):

clined while that of medium and large pearls rose (46 percent of the production was small pearls, 41 percent medium, and 13 percent large).

Oysters: There were 8,009 producers of oysters, a drop of 469 from the preceding year. This drop was due to producers in Iwate and Miyagi prefectures switching to laver growing. Production of shucked meats was 24,000 metric tons, an increase of 4,000 tons. Production has been rising smoothly for the past 5 years. There were increases in all of the principal producing prefectures of Iwate, Miyagi, Saga, and Hiroshima, with a particularly large increase in Hiroshima.

Laver: There were 63,700 producers of laver, an increase of about 2,000 over the preceding year. Production was 2,290 million sheets of the dried seaweed, an increase of about 10 percent. Production dropped about 30 percent in the Northeast and in Tokyo Bay, and increased at about the same rate in Ise and Mikawa Bays. The Ariake Sea had an increase of 114 percent. Production increases by types were 4.7 percent for purple laver, 11 percent for mixed, and 35 percent for green laver.

Prices: Compared with the preceding fiscal year, pearl prices were up over-all by 19 percent. Purple laver prices were up 12 percent and green laver prices were up by 35 percent, but the prices of mixed laver were down by 15 percent. (The Suisan Keizai, July 26, 1960.)

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ECONOMIC TRENDS IN THE FISHERIES, 1959:

The Economic Base in 1959: In 1959, the Japanese economy recovered from the stagnation of the preceding year and showed a growth rate for which there are few precedents in the world, producing the so-called "Sun Goddess Boom." The step-up in productive activity brought an increase in investments and in employment; an improvement in the conditions of employment; an increase in the earnings of workers. Earnings rose to a high level both in the cities and in the farming communities. There was also an increase in consumer expenditures. In fishery activities, too, investment flourished, and the expansion of production reached a new high. Processing activities to meet the new demand for fishery products because of changes in the nation's food habits were further expanded by the large fishing companies, and production and consumption of fishery products were generally active.

Fig. 1 - Japanese fish-meal factoryship Renshin Maru operating in Bering Sea, July 1960. Uses bottomfish caught by its fleet of 27 trawlers.

Fishery Production: No basic solution was found to conditions on international fishing grounds, but basic fishery production in 1959 was 5.88 million metric tons, the highest in history and 7 percent above the previous year. This was due to increases in the catches of such important species of the offshore and high-seas fisheries as mackerel scad, mackerel, squid, saury, and tunas.

Investment Trends: The increase in production was assisted by fishing conditions and other favorable natural factors, but there was much help from the rapid modernization in recent years of the means of production and unceasing technical improvement. Investment in such sectors continued active during the year. In particular, in the case of fishing vessels over 15 meters (49 feet) in length, replacement with steel vessels, building of larger vessels, and installation of better equipment brought a further improvement in general quality. In smaller boats also, there was an advance in investment connected with installation of motor power, conversion to Diesel engines, etc., and the same was true for technical developments in the field of aquiculture. The large fishing companies continued to diversify their investments by strengthening their activities ashore.

Fisheries Financing: With the general improvement in economic conditions, there was a gradual relaxation of the tight money situation which prevailed the preceding year, and on the whole there was an increase in loans by financing agencies in response to

Japan (Contd.):

the increased demand for capital. In the fishing industry, new loans for facilities were 14 percent above the preceding year. The amount of increase of loans of short-term operating capital showed a tendency to decline as compared with the preceding year, but it can probably be said that there were no signs of a shortage of money. There was a particularly outstanding increase in the securing of capital by the big fishing companies through the issuance of industrial bonds.

Exports of Fishery Products: Supported by world economic recovery, Japan's international trade in 1959 showed a marked expansion. The rate of increase of Japan's export trade in fishery products, which had been 33 percent in 1958, dropped sharply to only 5.4 percent. This was due to a decline in canned products, which had shown a marked increase in 1958. Products of fishing countries other than Japan moved strongly into the world market in 1959.

Economic Trends: In 1959 fisheries production increased, and prices, reflecting demand, were fairly firm. Materials used by the fishing industry showed almost no increases in price, except for some rise in the price of fuel oil, and the supply of those materials was smooth, so that in general the conditions of operation in the fishing industry were favorable. However, this conclusion cannot be equally applied to an industry which includes various segments. In the coastal fisheries, some segments of aquiculture showed a tendency toward stability in 1959, and fishermen using small vessels increased their over-all income, if income from activities other than fishing is added. The income of medium and small fishery enterprises operating offshore and in distant waters tended to increase with the increase in production, but from the increased rate of seasonal participation in diversified fishing activity, it can probably be said that this segment experienced an intensification of competition in production. The large fishing companies strengthened their operating bases through diversification and had good earning prospects. (Japanese Fisheries Agency Weekly Report, vol. 11, no. 22, July 13, 1960.)

Fig. 2 - Japanese crab factory vessel Shinyo Maru operating in the North Pacific. Processes mostly frozen crab and fish.

Domestic Demand for Fishery Products: Prosperity and the bumper rice crop were reflected in an increase in earnings, which brought improvements in the living standard of the people. Along with this came advances in the modernization and rationalization of the people's food habits. Demand for fishery products tended to move in the direction of fresh fish, processed fish of good quality, high-class items, and products easy to prepare for the table. But from the point of view of family income and expenditures, there was a tendency toward a stagnation of growth in both the amount of expenditure for fishery products and in the quantity of such products consumed (or purchased).

Movements of Fish Prices: Although production in 1958 was up by 2 percent over the preceding year, the over-all average price in the producing areas fell by 9 percent. In 1959, although production rose by 7 percent, the decline in prices was only 2 percent, so it can be said that they held fairly steady. Wholesale prices (Tokyo) rose on the average by 3 percent, and prices to the consumer in cities and rural communities were above those of 1958.

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Japan (Contd.):

OFFERS OF CANNED SARDINES SUSPENDED DUE TO SHORT PACK:

The Japanese Canned Fish and Shellfish Sales Company notified the exporters towards the latter part of August 1960 that it suspended sales of canned sardines because stocks were exhausted. The pack of canned sardines had been light--only 372,000 cases had been received from the packers and stocks on hand had been reduced to almost zero. No hope was held out for improved sardine fishing in the Sanin area during August, but an improvement was expected in mid-September. The sardines received were sold to the Philippines and African countries. (Suisan Tsushin, August 19, 1960.)

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INTEREST RATE CUT ON FISHING VESSEL FINANCING:

The Agriculture and Fisheries Public Fund has been asking the Japanese Ministry of Finance for approval of the decrease in interest rates for small vessels as envisaged in its directive for the promotion of modernization in the coastal fisheries. The approval of the Banking Bureau had been secured as of July 1960, and the Accounting Bureau was expected to give its approval.

Involved are loans for 1,898 vessels (totaling 6,760 tons gross) from a budget of 613 million yen (US$1.7 million) on terms of 6.5 percent interest, with a maximum of 10 years for repayment and 2 years for deferral, with financing of up to 80 percent of the cost of the vessel.

The financing plans are for 1,760 boats of less than 5 tons gross at 100,000 yen (about $278) per ton for a total of 431 million yen ($1.2 million); 83 vessels of 5 to 10 gross tons at 150,000 yen ($477) per ton for a total of 79 million yen (219,000); and 55 vessels of over 10 gross tons at 180,000 yen ($500) per ton for a total of 130 million yen ($361,000). In the case of boats under 5 gross tons, emphasis will be on constructing replacements for over-age vessels and improving vessel efficiency. (The Suisan Keizai, July 26, 1960.)

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LAUNCH LARGE STERN-TYPE TRAWLER:

The Amagi Maru (2,250 tons), stern-type trawler of a large Japanese fishing company was turned over to its owner at a shipyard in Hiroshima. The vessel is 78.1 meters (256.2 feet) long, 13.5 meters (44.3 feet) wide, equipped with a Diesel engine developing 2,400 hp. and has a capacity for 214.5 metric tons of frozen fish, in addition to many improved facilities. The vessel, Japan's largest trawler of this type, was expected to sail in early October for fishing grounds around Australia and New Zealand. (Japanese Newspapers, September 12, 1960.)

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SALMON SHARK RESEARCH FLEET IN NORTH PACIFIC:

The Japanese salmon shark research fleet consisting of 2 long-line and 4 drift-net vessels operating around the Aleutian Islands in the North Pacific, reported around mid-August that it had captured 833 salmon sharks. Upon examination, 236 sharks, or about 30 percent of the total catch, were found to have eaten salmon. According to a technician of the Hokkaido Fisheries Research Institute, some of the shark had eaten 7 or 8 salmon.

The purpose of the investigation is to acquire data for the Japanese side in negotiations with the Soviet Union for next year's fishery talks. (Fisheries Economic News, August 25, 1960.)

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FROZEN SHRIMP IMPORTED FROM COMMUNIST CHINA:

A large Japanese fishing company has imported 15 metric tons of frozen taisho shrimp (Penaeus orientalis) from Communist China, and expected to put them on sale at the Tokyo fish market in August 1960. This is the first import of Communist China shrimp this year. On August 8, it was expected that 300 boxes (each containing 25 pounds) would be received at Tokyo from Shimonoseki, and further shipments were expected to follow. The price had not been set, but the importing company's Shimonoseki office was thinking of selling at 700-750 yen per kilogram (88.2 to 94.5 U. S. cents a lb.). It was also reported that dealers in the Tokyo market will be handling frozen shrimp imported from Communist China by two other large Japanese fishing companies. (The Suisan Keizai, July 26, 1960.)

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SOVIET FISHERIES MISSION INSPECTS FISHERIES FACILITIES:

An eight-member Soviet fishery mission arrived in Japan on September 6, 1960, aboard

Japan (Contd.):

the Soviet ship Yakutia. The mission is visiting Japan in accordance with the terms of the Japan-U.S.S.R. Fisheries Agreement and was scheduled to inspect Japanese fishery facilities in Hokkaido for a period of about one month.

On his arrival, the head of the mission stated to the Japanese press that there was need for both Japan and Russia to take strong measures for controlling salmon fishing operations. In a separate press interview, he added that the Soviet Union had reduced their operations in accordance with the limitations set by the two countries as the result of their annual negotiations. He held out hope to the Japanese that the maximum fishing catch could be raised at a later date if research and investigation work should prove that salmon resources are increasing. He said, however, that in the meantime measures for the conservation of resources and the maintenance of good spawning conditions would have to be strictly observed if salmon fishing over the long run is to be assured. (U.S. Embassy in Tokyo, September 9, 1960.)

Libya

TUNA FISHERY TRENDS, SECOND QUARTER 1960:

In Tripolitania the tuna-fishing season this year began under very inauspicious circumstances. By mid-April only six companies were able to resume operations. "Technical difficulties" (e.g., labor shortages or financial difficulties) prevented five other companies from operating this season. During the late April-to-early-June period, the companies operated off the western Tripolitania coast. Local sources described the tuna catch as satisfactory. After mid-June the fishing was concentrated off the eastern shores of the Province where the catch was better than average as of the end of July. (United States Embassy, Tripoli, July 30, 1960.)

Mexico

EXPORT DUTIES INCREASED ON SHRIMP AND CRABS:

Effective August 21, 1960 (Diario Oficial, August 20, 1960) by changes in official prices, upon which ad valorem duties are based, Mexico increased export duties on shrimp and "walking" crabs and reduced export duties on live turtles. On fresh or iced shrimp duty increases amount to about 1.89 U. S. cents a pound for shrimp originating in the Gulf of Mexico and about 1.73 cents a pound for shrimp from the Pacific. Duty increases on frozen shrimp amount to about one-third of a cent a pound on shrimp coming from the Gulf of Mexico and Salina Cruz, Oaxaca, and Santa Rosalia, Baja California, and about three-tenths of a cent a pound on shrimp originating in other regions.

The new export duty rates on fresh or iced shrimp are about 13.439 U. S. cents a pound for shrimp from the Gulf of Mexico and 13.069 cents a pound for those from the Pacific. On frozen shrimp the new duty rates are 2.510 U. S. cents a pound for frozen shrimp from the Gulf of Mexico and Salina Cruz, Oaxaca, and Santa Rosalia, Baja California, and 2.443 cents a pound for frozen shrimp originating elsewhere. Official prices were increased from 1,223 and 1,250 pesos per 100 net kilos to 1,410 and 1,450 pesos, respectively. The higher prices pertain to shrimp originating in the Gulf of Mexico. Duty rates, per 100 net kilos, are 0.30 pesos specific plus 25 percent ad valorem for fresh or iced shrimp and 2.50 pesos specific plus 4.5 percent ad valorem for frozen shrimp. The ad valorem duty is based on the official price. In addition to the export duties there is a 2-percent municipal tax placed on the amount of the export tax.

Most of Mexico's exports are frozen shrimp. According to official statistics, Mexico in 1959 exported only 16,400 pounds of fresh or iced shrimp whereas 65.5 million pounds of frozen shrimp were exported during the same year.

The official price for fresh, iced, or frozen Moro crabs (Menippe mercenaria) and other "walking" crabs was increased from 4.00 pesos to 6.80 pesos a gross kilo. This involves a duty increase from about 1.48 U. S. cents (old rate) to about 2.52 U. S. cents per gross pound. There was no change in duty on swimming crabs. According to official

Mexico (Contd.):

statistics, there were no exports of either Moro or other "walking" crabs during 1959.

The official price on live marine turtles, other than tortoise-shell turtles, was reduced from 2.80 to 2.00 pesos a gross kilo. Export duties, as a consequence, dropped from about 1.04 to about 0.74 U. S. cents a gross pound. Mexican exports of live turtles in 1959 were 167,600 pounds.

It is not expected that the duty changes reported here will have any appreciable effect on Mexican exports of the items mentioned. (United States Embassy, Mexico City, August 23, 1960.)

Morocco

FISH MEAL AND OIL INDUSTRY:

In 1959 Morocco produced 17,714 metric tons of fish meal, 4,694 tons of fish oil, and 115 tons of other fishery byproducts. These products are manufactured primarily at Agadir and Safi. There seems to be no production of fish meal as fertilizer.

In each port of Morocco, the official CARPI Agency (Comptoir d'Agreage et de Repartition du Poisson Industriel)

takes care of the distribution of landed fish, taking into account the quality and the needs of local consumption and industry. Thus, the price of fish destined for byproducts is fixed. At present, manufacturers consider that the prices

Moroccan Fish Meal and Fish Body Oil Exports, 1958-59

Product and Country of Destination	1959 Quantity	1959 Value		1958 Quantity	1958 Value	
	Metric Tons	1,000 Moroccan Francs	US$	Metric Tons	1,000 Moroccan Francs	US$
Fish Meal:						
France	8,113	473,679	936,084	12,362	795,537	1,572,140
West Germany	2,942	172,562	341,017	1,913	93,120	184,024
Spain	1,048	56,363	111,385	288	14,172	28,007
Hungary	100	6,206	12,264	-	-	-
Poland	298	17,237	34,064	200	10,263	20,282
Netherlands	272	15,539	30,708	-	-	-
Czechoslovakia	1,011	58,623	115,851	667	40,451	79,939
East Germany	300	18,876	37,303	-	-	-
Yugoslavia	-	-	-	397	24,302	48,026
Brit. Terr. Asia	99	6,455	12,756	-	-	-
United States	200	12,110	23,932	796	47,012	92,905
West Africa	-	30	59	-	-	-
Madagascar	130	9,646	19,062	25	1,641	3,243
Switzerland	2	287	567	-	34	67
Total Meal	14,515	847,613	1,675,052	16,648	1,026,532	2,028,633
Fish Body Oil:						
France	3,085	197,518	390,335	1/	1/	1/
West Germany	463	23,941	47,312	1/	1/	1/
Netherlands	283	15,260	30,157	1/	1/	1/
Norway	100	6,807	13,452	1/	1/	1/
Total Oil	3,931	243,526	481,256	1/	1/	1/

1/Not available.
Note: Values converted at rate of one Moroccan franc equals US$0.0019762 (506 Moroccan francs equal US$1.00).

Morocco (Contd.):

paid for raw material are too high, as they do not permit any fair competition on foreign markets.

At Safi, the price of fish (chiefly sardines) destined for byproducts was fixed at 8 francs a kilo (US$14.60 a short ton), which including taxes, disembarkment, and transportation costs, amounts to 9.97 French francs a kilo (US$18.00 a ton) of fish brought to the plant.

Manufacturers also use waste fish from canneries or freezing plants. In that case, the price is lower, as it is fixed at the end of the fishing year and usually reaches an average of 7 francs a kilo (US$12.60 a ton).

Fish meal and oil prices are essentially changeable and depend on the prices offered on foreign markets. Each plant fixes, considering its own cost price, its possibilities of production and exports, according to those foreign prices. Prices were sharply declining the latter part of July 1960 and were:

At Hamburg:

From Peru: 43 and 40 French francs a kilo (US$78 and $72 a short ton) f.o.b. Peruvian port (65 percent protein). These prices are considered by Peruvian exporters as below their cost price.

From Norway: Herring 79-80 francs a kilo (US$144-146 a short ton), c.i.f. Marseilles.

From France: 58 francs a kilo ($106 a short ton), railway station La Rochelle.

At France:

From Peru: 58 francs a kilo (US$106 a short ton), from railway station of Nantes.

From Morocco: 62 francs a kilo (US$112 a short ton), from railway station of Nantes.

Moroccan manufacturers consider that the above prices do not cover their present cost prices.

Fish oil is sold at different prices depending on the quality. Prices in July 1960 ranged from 64 francs a kilo (5.8 U. S. cents a pound) for crude fish oils to 99 francs a kilo (9 U. S. cents a pound) for refined, deodorized oils, c.i.f. French ports. (United States Embassy, Rabat, June 27, 1960.)

Note: Unless otherwise indicated, values converted at rate of one French franc equals US$0.002 (490.60 francs equal US$1.00).

Netherlands

WHALE-OIL TANKER SOLD TO JAPANESE:

The Netherlands whaling company and a Japanese whaling firm have signed a contract concerning the sale of the Dutch 10,725-ton whale-oil tanker Bloemendael. According to the Netherlands Whaling Company, the contract price was Ł420,000 (US$1,176,000) delivered at Yokohama. The contract is subject to approval by the Japanese Government.

The Japanese firm has reportedly purchased the ship in order to prepare for whaling operations in the Central and North Pacific.

The Netherlands Government will benefit from the sale, since the contract between the Government and the Netherlands whaling company stipulates that the Government will receive any amount in excess of the presently-determined book value based on allowances for depreciation. The tanker, built in 1931 (at which time it was the William Barendsz), originally was used as a factoryship. (United States Consulate in Amsterdam, August 31, 1960.)

Norway

FROZEN FISH EXPORT TRENDS:

The Norwegian frozen fish organization, whose brand of frozen fish has found wide acceptance in the United States, recently joined forces with an 80-year-old Dutch food packing firm for distribution of Norwegian frozen fish in the Netherlands and other Benelux countries. But Norwegian frozen fishery products have been sold in the Netherlands for some ten years through a subsidiary whose name now will be changed to reflect ownership by the Norwegian organization and the Netherlands firm.

The Norwegian frozen fish organization, whose gross sales in the fiscal year that ended June 30, 1960, rose Kr. 20 million (US$2.8 million) to reach about Kr. 90 million ($12.6 million), hopes to export 1,000 metric tons to Great Britain this year. In cooperation with a British refrigerator manufacturer, a nationwide advertising campaign was expected to be launched in October.

Norway's second largest exporter of frozen fish fillets has had a record supply of raw material this year. In the first half of 1960, the firm's plant at Hammerfest, North Norway, received 12,000 tons of fish, as against 7,000 tons in the same period of the preceding year, and a total of 13,000 tons in the entire year of 1959. Meanwhile, plans are proceeding to double the firm's present annual production of 6,000 tons of frozen fillets. (News of Norway, September 8, 1960.)

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Norway (Contd.):

NATIONAL FISHERIES FAIR 1960:

The National Fisheries Fair 1960, largest in Norway's history, was held in the west coast port of Bergen, August 25-September 11, under auspices of Norwegian Trade Fairs. The event was opened by King Olav, who also formally dedicated the new 10-story Oceanographic Research Institute. This was built by the Fisheries Directorate at a cost of Kr. 5.5 million (US$770,000). At the same time, the adjoining Bergen Aquarium was opened for public inspection. Biggest and most modern aquarium in Europe, the Kr. 3.5 million (US$490,000) structure was financed exclusively by local contributions.

The Fair graphically illustrated the rapid strides made by Norway's fishing industry in recent years. Seafood products, modern fishing gear, motors, vessels, navigational aids, and other electronic instruments, were shown at 218 stands. Among the 200 exhibitors were 40 firms from Great Britain, United States, Denmark, Sweden, France, Germany, and the Netherlands.

In connection with the sales fair, sponsors organized a series of trade meetings. There were separate sections for boat building machinery, boat equipment, technical aids, fishing gear, fish processing, canning, filleting, and freezing, exports and imports, as well as equipment for sports fishing. Other sections were devoted to activities of the Norwegian Sea Rescue Society, insurance, economic conditions of Norway's fishermen and fishing industry, social benefits, the Fishery Bank, and fishery inspection. Research experimentation, and administration of the Fisheries Directorate were also emphasized.

Exposition buildings had a total floor space of some 75,000 square feet. The 14,000 square foot general section offered numerous attractions, including a giant relief map of Norway with magnetized fishing vessels that could be directed to the main coastal fishing grounds. Color movies, showing fishermen in action, were shown several times each day, while experts demonstrated ways of preparing and cooking fish and other sea products.

A major attraction is the Bergen Aquarium. The public part of the aquarium comprises one general and one special section, located on separate levels. The former presents a vast variety of mixed fish and other sea creatures in nine glass tanks lining a circular room. The 19x22 foot tanks have wide-angle side walls, thus giving the impression of a single, undivided aquarium. The special section, also comprising a series of glass tanks, is designed to demonstrate three themes--the development of species, specialization to meet changing environments, and habits of individual fish species.

Closed to the public is a huge circular tank below the aquarium levels. When finished in another year, this will give researchers an opportunity to study the actions of ocean currents and their effect upon fish behavior. The 10-foot wide tank forms the outer ring of a circular research laboratory, over 50 feet in diameter, with a glass-walled observation room for researchers in the center.

Ten feet deep, the tank is divided into 10 compartments, each separated from the observation room by two windows, and each capable of being closed off from the rest. By varying the density of water fed into the tank, Norwegian scientists will seek to create different layers of current in various compartments. Thus, they hope to throw new light on the interaction of ocean currents and, also, how fish are affected by changes in currents, temperatures, and salinity.

The Bergen Aquarium is connected with the Oceanographic Research Institute, located in a building of striking architecture. The Institute accommodates administration offices as well as a number of specialized research laboratories. The latter cover physical oceanography, various fisheries--such as cod, herring, brisling, sardines, and mackerel--plus plankton. A department for fish physiology and behavior is also projected. (News of Norway, September 1, 1960.)

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WEST AFRICAN EXPLORATORY FISHING EXPEDITION PLANNED:

The Norwegian Directorate of Fisheries is actively engaged in assembling a fleet of 10 fishing vessels to accompany the Directorate's research vessel Johan Hjort and the freezership Caribia on an exploratory fishing expedition to the West African coast this year. According to Fiskaren (August 3, 1960), a Norwegian fishery trade periodical, 19 fishing craft have expressed a desire to take part in the expedition. However, only 10 vessels

Norway (Contd.):

will be taken and they will be offered a guarantee against loss up to 75,000 Kroner (US$10,500) per vessel for the months of October, November, and December.

The Directorate of Fisheries is interested in steel vessels with freezing equipment and insulated cold-storage rooms which can hold the catch at 32° F. The vessels must have cod or pollock seines or long lines for tuna. A specific vessel size has not been set, but it is thought that they should be about 100 feet in length.

Pakistan

FISH MEAL AND OIL INDUSTRY:

Pakistan's fish-meal industry is passing through an indeterminate stage due to the rapid decline in world prices and a lack of suitable stocks of fresh and dried fish.

Fish-meal production in 1959 was estimated at 3,000 long tons. Fish oil is produced on a very small scale by cottage industries; production figures are not available. No fish oil was exported from Pakistan in 1959.

Pakistan's fish-meal industry consists of approximately six commercial plants concentrated on the outskirts of Karachi. Of these, only two are modern reduction plants; the others employ the grinding process with sun-dried fish as the raw material. Total estimated capacity is approximately 130 tons per day. The Government of Pakistan plans to approve the establishment of a fish-meal plant in East Pakistan and a large plant in West Pakistan at Gwadur. The West Pakistan plant will have a 75-ton-per-day reduction capacity and will also have fish-oil extraction facilities; it is expected that the plant will be in operation by April 1961.

It is estimated that the cost of production of fish meal in Pakistan is between Rs. 430 and Rs. 480 (US$91 to $102) per long ton for those factories which have their own fishing trawlers. Sardines used for reduction purposes cost from Rs. 120 to Rs. 140 (US$25 to $30) per ton, while fish heads, fish waste, and sharks cost Rs. 60 (US$13) per ton. Fresh fish used in the two modern fish-meal plants is not available on a continuing basis.

Present fish-meal prices of approximately 28 pounds sterling (US$79) 1/a long ton, cost and freight Continental port, bring in no buyers, but prices lower than £25 (US$70) bring in some buyers, mainly from Germany, Holland, and Ceylon. In 1959, Pakistan's highest export price to West Germany was £47 (US$132) a ton.

There are no Government aids or special taxes for the benefit of Pakistan's fish-meal and oil industry. But under the Export Bonus Scheme which came into operation in January 1959, Pakistan's exporters of certain commodities, including fish meal, can utilize a stated percentage of their foreign exchange earnings for the importation of some 219 commodities. Exporters of fish meal and oil are entitled to bonus vouchers up to 20 percent of the foreign exchange earnings. The Government of Pakistan has recently informed fish-meal exporters that the bonus entitlement has been raised from 20 to 40 percent. These bonus vouchers can be sold openly and at present are worth a premium of Rs. 120 (US$25) for the face value of Rs. 100 (US$21). The prospect of earning this premium enables the Pakistani exporter to reduce his export prices.

Table 1 - Pakistan's Fish Meal Exports, 1959

Country of Destination	Quantity	Value	
	Long Tons	Rupees	US$
West Germany	1,524	661,211	139,846
Netherlands	120	39,503	8,355
United Kingdom	55	20,140	4,260
Ceylon	75	25,575	5,409
Total	1,774	746,429	157,870

Note: Values converted at rate of one rupee equals US$0.2115 (4.728 rupees equal US$1).

Peru's entry into the export market for fish meal (67 percent versus 47 percent for Pakistan) and an average export price of £28 (US$79) per metric ton, has adversely affected Pakistan's export trade. The demand for Pakistan's fish meal is now very slow. This, in turn, has resulted in lower production, now reported to be about 5-7 tons per day. One plant owner has sold out because the fish-meal business is now nonprofitable. (United States Embassy, Karachi, August 19, 1960.)

1/Values converted at rate of one pound sterling equals US$2.8094.

Panama

SHRIMP INDUSTRY STUDIED BY FAO EXPERT:

The Panamanian Government will receive preliminary recommendations from the Food and Agriculture Organization (FAO) to counteract a decline in its shrimp fishery. An expert from the Government Institute for Fisheries Research, Ymuiden, the Netherlands, under FAO auspices and at the request of the Panamanian Government, has been interpreting data on Panama's shrimp industry collected since 1954, when a previous FAO fishery expert set up a research laboratory in Panama City. The expert completed the study in mid-1960.

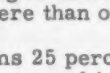
The profits from shrimp fishing, which had in the beginning been good, had started to decline, so that in recent years the industry had economic difficulties. Analysis of the fishing intensity and shrimp resources has indicated that changes in the catches are due partly to

Panama (Contd.):

intensive fishing. Some Panamanian ships have already been forced to turn to shrimp fishing off other Latin American countries, the FAO expert's report points out. They often return to Panama to land the shrimp for processing, if the distance is not too great.

In 1958, the shrimp fleet numbered just over 200 vessels. In June 1960 there were 160 vessels left in the fleet, with 15 more vessels planning to leave the fleet to fish shrimp elsewhere than off Panama.

Shrimp forms 25 percent of Panama's exports, and is second in importance only to bananas as an export product. Apart from a small amount of shrimp used for home consumption, the country annually catches and exports 8 million pounds of shrimp, valued at $6 million. Nearly all of the exported shrimp goes to the United States.



Peru

FISHERIES TRENDS, SECOND QUARTER 1960:

During the second quarter of 1960, the important fishmeal industry of Peru was confronted with a deepening crisis, brought on by overproduction, reduced world demand, and low prices. Attempts of the industry to find a way of limiting production through self-imposed quotas have been without success. It is generally believed that such attempts will not be successful, but that natural economic factors will eventually work to bring stability to the industry.

Exports of fish meal were maintained at an unusually high rate for the first five months of the year, with a monthly average of about 51,000 metric tons (data based on shipping documents). An extended tie-up of anchovy fishermen in April and May, poor fishing in the Callao area, and seasonally reduced fishing in the third quarter will probably result in a reduced rate of production during the remainder of the year. Members of the trade consider that a realistic production figure for 1960 would be about 500,000 tons.

Exports of fishery products for the first 3 months of 1960 increased by 157 percent as compared with the same period of 1959, but the increase in f.o.b. value was only 97 percent. Fish meal exports increased 190 percent in quantity and 130 percent in value. Other fishery products exports, which were larger in the first quarter of 1960 than in 1958, included frozen skipjack tuna and shrimp, canned bonito, fish oil, and whale oil. Since fish meal exports constitute between 85 and 90 percent of total fisheries industry exports by quantity (between 70 and 80 percent by value), there can be no doubt of the importance to the fisheries in-

Peru's Principal Fishery Products Exports, First Quarter 1958-1960

Products	Quantity			F.o.b Value					
	1960	1959	1958	1960		1959		1958	
	(Metric Tons)			Soles 1 Million	US$ 1,000	Soles 1 Million	US$ 1,000	Soles 1 Million	US$ 1,000
Frozen fish:									
Skipjack tuna	1,650	930	640	4.7	170	2.9	110	1.5	71
Other tuna	2,396	2,976	1,401	7.0	253	9.0	341	3.3	155
Swordfish	4	32	7	0.05	2	0.4	15	0.1	5
Shrimp ("Langostinos")	40	13	71	1.0	36	0.3	11	1.3	61
Total frozen fish	4,090	3,951	2,119	12.7	461	12.6	477	6.2	292
Canned fish:									
Bonito	4,166	3,540	2,884	40.8	1,473	34.7	1,314	22.1	1,040
Tuna	110	241	277	1.0	36	2.1	80	1.6	75
Total canned fish	4,276	3,781	3,161	41.8	1,509	36.8	1,394	23.7	1,115
Fish byproducts:									
Fish meal	148,091	51,058	24,492	360.2	13,004	156.7	5,936	51.7	2,434
Sperm oil	4,808	3,749	2,790	15.9	574	12.7	481	9.2	433
Fish oil	4,903	1,301	927	13.7	495	3.4	129	2.4	113
Whale meal	308	998	400	0.5	18	3.1	117	0.7	33
Total byproducts	158,110	57,106	28,609	390.3	14,091	175.9	6,663	64.(	3,013
Total fishery exports	166,476	64,838	33,889	444.8	16,061	225.3	8,534	93.9	4,420

1/Average rate for U. S. dollar exchange certificates was 27.70 soles in the first quarter of 1960; 26.40 soles in the same period of 1959; and 21.24 soles in the first quarter of 1958.

Peru (Contd.)

dustry and to the economy of Peru as a whole of an early solution to the present problems of the fish-meal producing industry.

Cost of production is an important factor in the ability of Peru's fish meal producers to withstand the current difficult period. When prices began to fall from a high of about US$140 per ton in 1958 to $90 at the close of 1959, production costs were stated to be about $90. As prices have come down, production cost estimates have been lowered. It has been authoritatively stated that $58-63 is the absolute minimum at which a ton of fish meal can be produced in an efficient plant. One of the largest producers is reported to have said recently that his costs are considerably less than that, and that he expects to reduce them even further with the installation of new equipment. Doubt has been expressed by other producers that a lower cost figure than about $58 per ton is possible. Another producer, without mentioning actual costs, insisted that reducing them represents the principal way in which Peruvian producers can weather their present difficulties and continue to produce and sell fish meal in the world market. A number of plants have closed because prices are below costs and it is believed that other plants will follow. Some may not be able to reopen.

The average price for fish meal (65-percent protein) f.o.b. Peruvian ports for the April-June 1960 quarter was US$73.33 ($80.00 in April, $75.00 in May, and $65.00 in June). During the same period of 1959, fish meal prices averaged $128.33 f.o.b. Peruvian ports ($135.00 in April, $130.00 in May, and $120.00 in June 1959).

The construction of boats primarily for anchovy fishing continues at a rate somewhat below that of 1959 in the shipyards of Callao. One of the largest yards built 90 vessels in 1959, for the most part wooden vessels up to 80 tons. Up to mid-June 1960, that yard had built 12 wooden vessels and 22 steel-hulled vessels of 80 to 120 tons. At the end of June, the keel was laid for a 180-ton steel-hulled vessel, the largest fishing boat ever built in Peru. The increasing size of these boats seems to indicate a trend towards the construction of larger vessels to help cut costs for fish meal producers.

The continuing construction of fishing vessels in the face of the closing of fish meal plants and the likelihood that fishing equipment now in use will have to be beached represents a paradox explicable only in the same terms as the overexpansion of the fish meal industry; that is, the accelerated rhythm of too rapid expansion has not yet been halted. Observers believe, however, that there is a definite reduction in the rate of expansion and that it will come to a complete halt in the near future.

The municipalities of the Greater Lima area extended to September 3 the period allowed fish meal plants to eliminate obnoxious odors. (United States Embassy report, Lima, July 15, 1960.)

Philippines

GOVERNMENT MAY REDUCE 25-PERCENT EXCHANGE MARGIN TAX:

The Director General of the Philippine National Bank, member of the Philippines Central Bank Monetary Committee, is reported to have stated that a reduction is being considered in the exchange margin tax from the present 25 percent rate. He said a strong request had been made by industry to alleviate the Government policy of tightening up exchange control. The reduction will be timed with steps to be taken for the safe and effective use of the foreign exchange held by the Government.

The margin tax has been applied since last year to all Philippine canned foods imports other than canned sardines and salmon. The Japanese report that it has caused canned salmon, cuttlefish or squid, "horse-mackerel," and common mackerel exports to the Philippines to drop. In the case of canned mackerel-pike, a large reduction in price had to be put in effect. In the case of canned cuttlefish, many purchase contracts were cancelled and heavy stocks have built up in Japan. (The Suisan Tsushin, August 20, 1960.)

Portugal

UNITED STATES SHIPMENT OF LIVE STRIPED BASS RECEIVED:

Fifty striped bass arrived in Lisbon, Portugal, August 25, 1960, by air from Rhode Island, and were taken to a sea-water lagoon for recovery and initial breeding. At a later date, they will be transferred to southern shore waters where it is hoped they will multiply as they did years ago when transplanted from the United States east coast to the west coast. The shipment was the result of cooperation between a well-to-do Portuguese amateur fisherman and the Department of Agriculture and Conservation of Rhode Island. (United States Embassy in Lisbon, September 2, 1960.)

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COD CATCH FROM WESTERN ATLANTIC BETTER THIS YEAR:

Reports from the Portuguese cod fleet fishing on the Greenland and Newfoundland Banks confirm earlier expectations that fishing is much better than in 1958 and 1959. Some 11 trawlers are reported to have returned to Portugal with full cargoes and gone back to the Banks for a second voyage. Only four trawlers made two trips in 1959, the United States Embassy in Lisbon reported on September 2, 1960.

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Portugal (Contd.):

COMMITTEE ESTABLISHED TO STUDY FISH CANNING AND EXPORTING ASSOCIATIONS:

The Portuguese Secretary of State for Commerce on August 30, 1960, formally installed an 8-man committee of industry and Government representatives to study the regulations and operations of the "Associations" (cooperative-type marketing groups) of manufacturers and exporters of canned fish. The committee's findings, if implemented by the Government, may have much significance for marketing practices in the fish-canning industry. The survey of the industry will not be complete, however, until a committee to consider relations between fishing and fish-selling practices and the industry has also been appointed and completed its study. Appointment of this second committee was expected soon, but several months may well elapse before both have completed their work, the United States Embassy, Lisbon, reported on September 2,1960.

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SEAWEEDS IN THE CAPE VERDE ISLANDS AREA STUDIED:

The Center for Fisheries Biology maintained by the Overseas Investigation Board of the Ministry of Overseas carried out a study during 1958 of the availability of agar-bearing seaweeds in the Cape Verde Islands area. The results of the study were not encouraging as the quantities found did not justify commercial exploitation or further investigation.

A similar study is being carried out along the shores of continental Portugal.

Ryukyu Islands

FROZEN TUNA TO BE EXPORTED TO JAPAN:

The Japanese Ministry of International Trade and Industry early in September designated frozen tuna from the Ryukyu Islands as an import item. As a result, Japan will import some 500 metric tons of tuna from Okinawa in compliance with the request of the Ryukyu Government after talks between the two countries. The Japanese feel that the imports will not, in any way, affect Japan's skipjack tuna fishery since the quantity is but 500 tons a year, but there are hopes of increasing the quantity in the future. (Fisheries Economic News, September 6, 1960.)

Spain

FISH MEAL AND OIL INDUSTRY AND MARKET:

There are some 60 to 65 producers of fish meal and oil in Spain. The greatest concentration (37) is located in the Canary Islands--the remainder is found along the Spanish coastal region. Of the total approximately 12 are major producers. The capacity of the Spanish industry is not known. Preliminary production data for 1959 show that 17,835 metric tons of fish meal and 1,433 tons of fish oil were produced; however, it has been reported that this estimate is below actual production. It is possible that actual capacity may be 3 or 4 times present production. It is known that fish-meal production has almost tripled since 1955, without any significant addition to plant capacity.

There are no known developments or plans for development of the fish meal and oil industry of Spain. In addition, there are no government programs designed to assist the fish meal or fish oil industry, except for import restrictions. However, manufacturers are eligible for low-interest loans from the Marine Social Institute for building and modernization, although most of the loans granted by that agency are for improvement of the fishing fleet.

The importation of both fish meal and oil is controlled by import license. The amount of fish-meal imports authorized has in recent years been limited to an approximation of the difference between national production and national consumption needs as calculated by the National Fish Syndicate. According to the Syndicate, fish-meal imports may soon be liberalized in spite of the protests of fish-meal producers who claim that imports from Portuguese Angola and Peru will inundate the Spanish market at "dumping prices."

Table 1 - Spanish Imports of Fish Meal and Oil, 1957-60

Product	Jan.-Feb. 1960	1959	1958	1957
	(Metric Tons)			
Fish meal	2,503	-	2,415	3,987
Fish oil	188	2,323	3,715	2,584

Current duties on imported fish meal are 5 percent ad valorem and an additional 2 percent "fiscal tariff" levied on the value plus the 5-percent duty. For fish oils, a duty of 1 percent and a "fiscal tariff" of 4 percent are imposed on crude oils, and a duty of 6 percent and a "fiscal tariff" of 4 percent on refined oils. Duties are imposed on the c.i.f. value of the merchandise.

The price of fish oil imported into Spain varies between 5 and 6 pesetas per kilo (4 and 5 U.S. cents per pound) 1/.

In the case of fish meal, free imports would probably result in increased consumption of fish meal for animal feeds, and a diminished share of the domestic market for Spanish producers. At the present time, high-grade Spanish fish meal sells for 14 pesetas per kilo (US$211 per short ton), compared with a price of 9 pesetas (US$136) for imports from Angola and Peru. Until now, this price difference has not harmed Spanish producers since imports have been limited to covering the gap between estimated consumption needs and domestic production. It is unlikely that Spanish producers will be able to cut their prices to compete with low-priced imports because of the

Spain (Contd.)

relative scarcity and the high price of the fish used in production. (United States Consulate dispatch from Vigo, August 16, 1960.)

1/Values converted at the rate of one peseta equals US$0.0166 (60 pesetas equal US$1.00).

Sweden

EFFECT OF EUROPEAN TRADE PACTS ON FISH-CANNING INDUSTRY:

In discussing the effect of the European Free Trade Association (EFTA) and the European Common Market on the sale of canned fish products, the Director of A/B Sveriges Forenade Konservfabrikker (The Swedish United Canning Factories), Goteborg, said in a press interview in August that the markets represented by the 13 countries included in the two pacts take only a relatively small part of the pack of the canneries involved and such sales as are made are about equally divided between the two groups.

Only about 15 percent of the annual output of the factories goes into export, principally to the United States and Canada. East Germany is also a large purchaser, especially of Swedish sardines.

The company's main market is the domestic market and the effect of the EFTA agreement will first be noticeable in the home market because canned fish products are protected by relatively high Swedish customs duties. No immediate problem, however, is expected to arise out of EFTA because the tariff reductions that have up to now been made under the agreement are relatively small. But even when the Swedish tariff rates are considerably reduced and eventually disappear, the possibilities will be good for the sale of the Swedish fish-canning industry's products in the domestic market. Through the refund to canneries of the regulating fees which are now levied on certain agricultural products, it is expected that the Swedish fish-canning industry will be placed on more equal terms with foreign producers.

In regard to the European Common Market, the Swedish canners count on maintaining the present export of traditional Swedish specialties if the tariff hindrance is not too great.

Within the European Free Trade Association, a greater export sale is expected with the lowering of the customs duties.

The certificate of origin procedure presents no problems to the fish-canning industry because the greater part of the raw material is considered domestic. Such import as does take place, for example Icelandic herring, can be easily documented.

In closing, the Director stressed that it must be remembered that the situation in the European market is very unclear and that it is not known what the future development will be in the politico-commercial field. For this reason, he said, it is difficult to judge what consequences can arise out of the division of the European market. (United States Embassy, Goteborg, August 22, 1960.)

Trinidad

SHRIMP FISHERY EXPANDS WITH VESSELS FROM UNITED STATES:

Using Port-of-Spain, Trinidad, as a base, a United States company has transferred 10 of its shrimp trawlers there to exploit the shrimp grounds off the Guianas. The company is registered in Trinidad and has leased space in a local cold-storage plant to set up shrimp processing and freezing facilities. The shrimp trawlers will obtain their fuel oil, ice, and stores in Port-of-Spain, and thus bring considerable business to the city, in addition to employing some 30 people at the processing plant. All of the processed packaged shrimp will be exported.

Each trawler is operated by a crew of 3 men and may take on local crew members and train them in shrimp fishing methods. The fleet will stay on the fishing grounds for prolonged periods and transfer catches to two of the trawlers, in rotation, every 6 or 7 days, to bring them to Port-of-Spain. If expectations are fulfilled, the company plans to increase its fleet to 30 boats by the end of 1960. (West Indies Fisheries Bulletin, May/June 1960.)

Tunisia

FISHERY TRENDS, SECOND QUARTER 1960:

Tunisia's tuna and sardine season this year began discouragingly with catches running well below early estimates. Reports from the southern fishing port of Mahdia said that early

A Tunisian fishing vessel hauling in a netload of sardines. A small boat equipped with electric surface lamps stays on the fishing grounds for several hours. Its lights attract the fish. The main fishing boat approaches the concentration of fish and encircles them with a purse seine.

sardine fishing efforts had met with almost total failure. As for tuna, the scarcity of local supplies was emphasized once again by a Japanese vessel discharging a large quantity (150 tons) of tuna at Mahdia where it was to be canned by the local cannery.

Meanwhile the Tunisian Government had not slackened its drive to develop other sectors of the fishing industry. A Yugoslav engineer arrived in Tunis in mid-June 1960 to take up his duties as Director of Tunisia's shipyards. According to announced plans, the National Fishing Office has drawn up a ten-year program calling for the construction in Tunisia of about 100 medium fishing craft.

Pending fishing craft construction in its own shipyards, the Fishing Office has acquired another trawler from abroad for its fishing fleet. The vessel, designed for shrimp fishing, is the third vessel the Fishing Office has purchased this year with a view to increasing the shrimp catch from the waters off southern Tunisia.

Delivery of the first 2 of the 4 United States-financed shrimp trawlers to the National Fishing Office has again been delayed. It was expected that the vessels would be handed over sometime in the fall of 1960. (United States Embassy, Tunis, August 6, 1960.)

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FAO EXPERT HELPS TO DEVELOP FISHERY RESOURCES:

A French FAO fishery expert, while in Tunisia for the past $3\frac{1}{2}$ years, was active in finding new fishing grounds. He charted the area bordering Tunisia and found grounds suitable for trawling shrimp, hake, lobster-like "scampi," and numerous other species of fish, near the Tunisian harbor of Kelibia. The International Cooperation Administration (ICA) is now outfitting the Tunisian Government with four trawlers to exploit these grounds.

The survey of the Tunisian fisheries showed possibilities for improvement in the sardine fisheries and in extending Tunisian trawling farther offshore. Together with an FAO master fisherman from Italy, the French expert introduced the use of an underwater lamp into Tunisian sardine fishing. Tunisians had been using lamps hung over the surface of the sea to attract sardines for purse-seining. However, the FAO expert's experiments showed that light from above the water lamps was mostly reflected upward by the sea surface and that one underwater lamp could do the job of eight of the above-surface lamps. Underwater lamps have now been adopted by most of the Tunisian sardine fishermen, with savings in fuel costs and increased efficiency. He also introduced the use of small Diesel-powered generators to operate the underwater lamps, reducing the sardine fleet's gas consumption by nine-tenths.

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THIRD TRIP OF FROZEN TUNA LANDED AT MAHDIA:

A Japanese fishing vessel has landed a trip of 100 metric tons of frozen tuna at the

Tunisia (Contd.):

Tunisian port of Mahdia. This trip is the third landed during the summer of 1960 for the fish-canning industry. (United States Embassy in Tunis, September 13, 1960.)

Union of South Africa

FISH PRODUCTION NOT CURTAILED IN SPITE OF BOYCOTTS:

The South African Fish Canners Association, representing all producers of canned fish in the inshore fishing industry in the Union and South West Africa, after considering the effects which the recent imposed boycotts by African nations on South African products may have on the economy of the fishing industry, stated August 5, 1960, that at this stage there would be no curtailing of production nor any contemplation of retrenchment of factory staffs and fishermen.

Over the last five years the industry has pursued a vigorous policy of building up export markets in many countries. This policy has been successful and will now be intensified. Wherever possible, alternative markets will be found.

Any further extension of the boycott movement may possibly lead to diversion of more raw fish supplies to the production of meal. While international fish-meal markets are presently depressed as a result of overproduction in Peru, a representative of the Union is attending talks in London, preparatory to an international convention of fish-meal manufacturers scheduled for September in Paris. It is hoped that some workable plan will be evolved whereby fish-meal producing countries will be able to enjoy more stable and more profitable export prices for the product. (United States Consulate, Cape Town, August 24, 1960.)

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PILCHARD-MAASBANKER 1960 LANDINGS SET NEW RECORD:

The 1960 pelagic shoal-fishing season on the Union of South Africa's Cape west coast closed at midnight on July 31, with a new record catch of 423,524 short tons, comprising 350,361 tons sardine or pilchard, 45,800 tons maasbanker, and 27,363 tons mackerel. This is the third successive year that the industry has had record landings. With the pilchard haul at South West Africa's Walvis Bay likely to be well over 300,000 tons, the total 1960 catch for the Union and South West Africa will be almost 900,000 tons.

Pilchard fishing will re-open on January 1, 1961. Mackerel and maasbanker fishing will open on November 1, 1960, and continue with pilchard fishing until July 31, 1961.

The recovery from the lean 1955/56 period has been sustained and for the first time in the history of the industry the official "quota" limit has been caught before the end of May. In anticipation the industry initiated discussions with the Director of Fisheries earlier in the year with the result that for 1960 at least, the tonnage limit on fish landed has been abandoned and replaced by a time limit in the Union of South Africa.

Although in 1960 the pelagic fish schools appeared up to July 31 over a wider area than in the previous few years, most catches were made in waters far south of the main concentration of factories. This has called for heavy investment in large vessels.

For the two fish meal factories in the Cape Peninsula, 1960 brought big increases in production. According to reports, one company processed 26,476 short tons of fish in the first six months of the season, compared with 16,990 tons last year. The second firm increased its intake from 27,653 to 38,752 tons.

The outstanding catches and high production figures of the Union's west coast factories have been partly offset--first by the depressed prices for fish meal on world markets, and, more recently, by political boycotts of South African products in some important markets.

Although South African fish meal did not drop to the £22 (about US$62) a ton paid for Peruvian meal, the price is low enough to alarm producers. And some form of rationalization of fish meal production and marketing on an international basis was likely to be a priority subject at the Paris meeting in September of the International Convention of Fish Meal Manufacturers.

The fish meal price coupled with a worldwide demand for canned fish may result in a

Union of South Africa (Contd.):

record output this year from South and South-West African canneries. In the Cape, production is restricted by the long distance that pilchards have to be carried from fishing grounds to the canneries in Saldanha and St. Helena Bay. But in Walvis Bay, where catches are made much closer to the factories, production was considerably higher than last year. By the end of June, one Walvis factory had nearly trebled its canned fish output of the same period last year.

With Ghana and Malaya boycotting South African products, some valuable markets have been lost and the effect will be felt by canners and by producers of dried fish, which has had a growing sale in Central and West Africa.

At least two South African fish-meal factories are packing part of their production in paper bags. These are exported to Germany where the paper bag is preferred. Towards the end of the season, one firm was packing in a bright yellow bag with a plastic layer. (The South African Shipping News and Fishing Industry Review, August 1960.)

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TWO VESSELS FISH TUNA WITH JAPANESE LONG-LINE GEAR:

As a result of tests now being carried out from two boats operating off the South African Cape coast, the Japanese long-line method of tuna fishing may one day be introduced to the South African fishing industry. Catches are reported to be encouraging. In one two-day fishing period the South African research boat Kunene landed 53 tuna weighing 3,840 pounds. The 70-ft. Kunene is one of two new wooden craft designed for the pilchard research program of the Union's Division of Fisheries. With her sistership Trachurus and the larger steel-built vessel Sardinops, the Kunene is occupied most of the time in the long-range pilchard research program. But for part of each month, usually about five days, she is used by the Division to test new fishing methods which may help to improve and diversify the fishing effort in South Africa.

The possibilities of tuna fishing in South African waters have long interested fishery scientists, fishermen, and industrialists. The fish are known to occur in considerable quantities off the Cape; they are caught by big-game fishermen, and the recent tests indicate that they may be available in sufficient concentration for commercial fishing.

The Kunene started the South African long-line tests towards the end of last year; the gear was imported from Japan. For a while the Kunene worked alone, but early this year a South African firm, in cooperation with the South African Museum and its Marine Biologist, also started long-line tests. These are now being carried out between Slangkop and Port Elizabeth, and the Kunene is operating north-west of Slangkop.

Using five baskets of 3/16-inch diameter Kuralon line, nearly a mile in length, the Kunene is working with six branch lines to a basket. Each branch line is about 12 fathoms long and is attached by dog clip to the main line. Glass float bubbles of about 20-lb. displacement are used. Hooks are baited with pilchards or mackerel, and are left in the water for 45 to 60 minutes before the line is pulled in by the boat's hydraulic line-hauler.

The best result to date was a catch made during a two-day period in oceanic water temperature 17° C. (62.6° F.) 60 miles west of Cape Town. The first set was made at daybreak, the setting taking ten minutes. After periods of from 45 to 60 minutes the hooks were hauled in. In all, the line was set seven times over the two days to give an equivalent of 210 hooks, which caught 53 tuna weighing a total of 3,840 pounds. Included in the catch were 15 big-eyed tuna (averaging 100-lbs. each); also albacore and bluefin. The fish ranged from 40 pounds to 170 pounds each in weight.

This was the most encouraging catch made by the Kunene and is regarded as a hopeful indication that the fish are available and can be exploited commercially.

While the Kunene is employed on long-line tests, her sister vessel Trachurus has been trying out a Canadian-type midwater trawl designed to be worked by one boat. The trawl, which is for fishing at intermediate depths, has not had much success with pilchards and maasbanker. (The South African Shipping News and Fishing Industry Review, June 1960.)

U.S.S.R.

FISHING AND WHALING FACTORYSHIPS TO BE BUILT IN WEST GERMANY:

The "Sudoimport" in Moscow has ordered two super factoryships of 18,000 and 25,000 dead-weight tons, respectively, from a West German shipyard. The two large fishing and whaling factoryships will cost a total of 220 million kroner (US$30.8 million). Keels will be laid early in 1961 and the vessels delivered the same year. The vessels will be about 180 meters (590.4 feet) long, 22.8 meters (74.8 feet) in breadth, and 8 meters (26.2 feet) deep.

The vessels will hunt whales for a short period in the tropic zone of the Pacific Ocean, and also catch fish in the tropics, off West Africa, Newfoundland, Greenland, and in the Arctic Ocean.

After the whaling season, the vessels will mount complete fish plants on the flensing deck to quick-freeze fish fillets, and produce fish meal and liver and vitamin oils. There will be fish oil tanks holding 11,000 cubic meters, cold-storage rooms (32,000 cubic meters) for fish fillets, and 4,400 cubic meters of fish-meal storage. The 6,250-hp. Diesel engine will give a speed of 14 knots.

The special requirements requested by the Russians included a landing place for

U.S.S.R. (Contd.):

helicopters, operating rooms, printshops, motion picture salons, and even Finnish baths.

With this order, the State-owned West German shipyard has received orders for vessels totaling 850 million kroner (US$119.0 million) from the Russians, including 24 fish factory-ships of the Pushkin class, repairs of ships, and 3 fast fruit refrigerator ships. (Fiskaren, August 17, 1960.)

* * * * *

TRANSPLANTED PACIFIC SALMON CAUGHT IN BARENTS AND WHITE SEAS:

Tens of thousands of transplanted Pacific salmon were caught for the first time this summer in the Barents and White Seas, according to information from Moscow published in a Japanese newspaper (August 29, 1960). This means the Russians have succeeded in transplanting salmon from the Pacific Ocean to the North Arctic Sea. The salmon were grown artificially from fertilized spawn taken from Saghalin. It is reported that some transplanted salmon were also caught off Norway.

* * * * *

12-MILE TERRITORIAL WATERS LIMIT ENACTED:

According to a wire from Moscow received in Tokyo, the Soviet Government has decreed through an official publication of its Highest Conference, a 12-mile limit for its territorial maritime waters. The decree was enacted and signed by Soviet President Leonid Brezhnev on August 5, 1960. This is the first time Russia has enacted a law officially promulgating territorial waters of 12 miles. (Japanese newspaper, September 8, 1960.)

Venezuela

SHRIMP INDUSTRY:

The fishing industry is not well developed in Venezuela. Modernization of fishing methods and processing and marketing techniques are necessary before Venezuela can satisfy domestic demand. The only organized part of the industry is the sardine canners.

Shrimp fishing occurs on the western shores of Lake Maracaibo; the coast of the Gulf of Venezuela; the coast of Anzoategui; between the mainland and the Island of Margarita; and on the mainland coast of the Gulf of Paria. Vessels take a mixed catch. There is a canning plant in Maracaibo and a freezing plant in Puerto la Cruz. The plant in Maracaibo canned shrimp in 1957, but there was no production in 1958. In 1959, some shrimp was packed (about 5.8 metric tons) in cans of 120 grams (3.9 ounces) divided about equally between wet and dry pack. The retail price in August 1960 was 2.75 bolivars per can (US$0.83). The plant in Puerto la Cruz produced 10 metric tons of frozen shrimp in 1959. Their estimate for three months' operation in 1960 is 12 tons. This plant purchases its shrimp from fishermen using shore nets or small inboard craft. Shrimp production for the canning season of 1960 has been poor because of dry weather affecting the grounds in the mouth of the Unare River. As of August 1960, no shrimp were for sale in Puerto la Cruz.

Table 1 - Venezuela's Shrimp Landings, 1956-1959 1/

Year	Quantity	Value	
	Metric Tons	Bolivars	US$
1959	1,588	2,324,955	697,487
1958	1,128	1,592,942	477,883
1957	974	2/	-
1956	723	2/	-

1/Includes camasones, "langostinos"--Penaeus schmitti Burkenroad, and Xiphopenaeus kroyeri.
2/Not known.

It is estimated that the 1960 catch will drop due to restrictions on otter trawling. Some 16 of the 32 trawlers operating in the eastern part of Venezuela have been put out of business by restrictive regulations.

Table 2 - Venezuela's Shrimp Exports, 1957-59 1/

Year and Destination	Quantity	Value	
	Metric Tons	Bolivars	US$
1959:			
Curacao, Netherlands Antilles	0.2	1,172	352
United States	0.5	2,560	768
Total	0.7	3,732	1,120
1958:			
Curacao, Netherlands Antilles	0.7	3,676	1,103
Puerto Rico	1.5	9,045	2,714
United States	2.9	15,678	4,703
Total	5.1	28,399	8,520
1957:			
Curacao, Netherlands Antilles	1.1	5,000	1,500
United States	7.3	20,358	6,107
Total	8.4	25,358	7,607

1/Includes fresh, frozen, and canned shrimp.

There are no export controls or taxes on shrimp in Venezuela. (United States Embassy, Caracas, August 25, 1960.)

Note: Values converted at rate of 1 bolivar equals US$0.30.

Yugoslavia

BAN LIFTED ON IMPORTS OF FROZEN JAPANESE TUNA:

Commercial negotiations between Yugoslavia and Japanese trading firms are in progress since it seems that the Yugoslavian

Yugoslavia (Contd.):

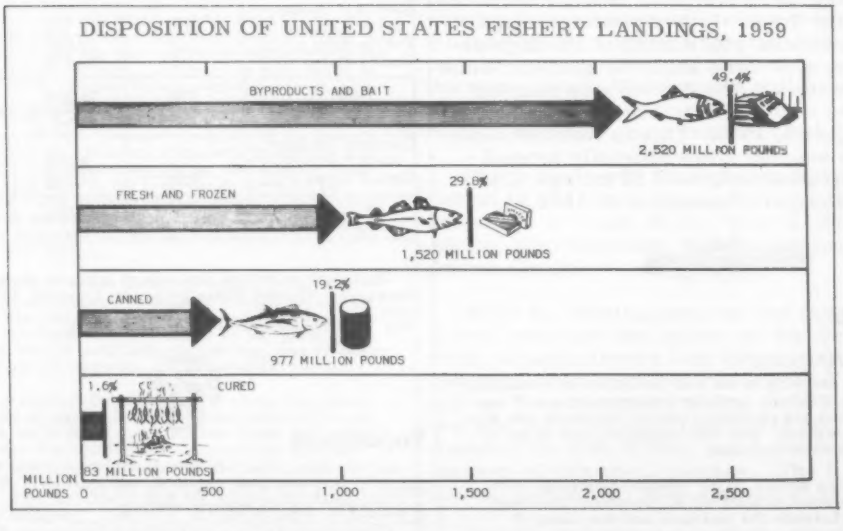
Government has lifted its ban on the issue of import licenses for frozen Japanese tuna. It was reported that the Yugoslavian Government decided to issue a license for the import of 4,500 metric tons of frozen Japanese tuna from September to December 1960. Yugoslavia had banned the import of frozen Japanese tuna from June through August 1960.

It was reported that the Yugoslavian buyers had mentioned a price as low as $210 a metric ton c. & f. but the Japanese countered with $250 or over because the Italian market was improving. Immediately after the abolition of the conference rate of tuna for shipments to Italy in mid-August, some sales at $220 c. & f. Italy or $180 a metric ton f.o.b. Dakar were not unusual. However, catches and shipments by Japanese fishing vessels operating in the Atlantic Ocean dropped and the price rose to $230 a ton c. & f. Also, prices offered for frozen Atlantic tuna shipped to the United States via intermediate ports firmed up. The price for albacore tuna delivered at Cristobal has bounced back to $280-290 a ton.

* * * * *

FROZEN TUNA IMPORTS FROM JAPAN BANNED FOR THREE MONTHS:

Yugoslavia stopped issuing licenses for imports of Japanese frozen tuna from June through August 1960 for two reasons: (1) exports of Yugoslavian canned tuna to both eastern and western Europe were extremely light early this year, and stocks on hand in Yugoslavia were greater than the domestic market could absorb; (2) sardine fishing in the Black Sea and off the Turkish coast was very good, and the canneries would keep operating without imports of frozen tuna. This caused cancellation of orders from Japan--about 2,500 metric tons of frozen tuna were involved, which was the amount planned for export to Yugoslavia for June-August.



FEDERAL ACTIONS

Department of the Interior

EXPLOITATION OF
FLORIDA CORAL REEF PRESERVE
TO BE STOPPED:

Approval of regulations protecting the Key Largo Coral Reef Preserve off the Florida coast was announced on September 19 by the Acting Secretary of the Interior Elmer F Bennett.

The regulations become effective on the tenth day after publication in the Federal Register. This emergency action is necessary because of commercial exploitation of the coral structure in the Preserve. This exploitation consists of blasting, dredging, and otherwise defacing or destroying the underwater scenic beauties of the area.

The regulation will prohibit the removal or destruction of the natural features or the shells and shellfish, starfish, and other marine invertebrates of the Preserve; dredging, filling, excavating, or any building; dumping refuse or otherwise polluting the area; tampering with wrecks or cargoes which might be within the boundaries.

Spear fishing and the use of poisons or electric-shocking devices are prohibited but skin diving with camera, for pleasure or observation, is permitted. Scientific specimens may be collected only on permit. No watercraft can be operated in any way that will damage the natural features of the Preserve. Possession or use of firearms, air guns, bows and arrows, slings, spears, harpoons, or any other type of weapon is prohibited.

Key Largo Coral Reef Preserve is a natural coral reef lying on the continental shelf off the southern tip of Florida. It lies partly within and partly without Florida's three-mile limit. It is approximately 21 miles long and about 4 miles wide. It has been made into a preserve by separate but coordinated actions by the State of Florida and the United States. The United States action was taken March 15, 1960, by a proclamation issued by the President. Florida has recently issued regulations similar to those which are now being promulgated by the Department.

FISH AND WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES

FISHING VESSEL CONSTRUCTION
DIFFERENTIAL SUBSIDY ANNOUNCED:

Regulations governing payment of construction differential subsidies for fishing vessels were published in the Federal Register of September 22, 1960. In the closing days of the 86th Congress, $750,000 was appropriated for construction differential payments.

Payments of not to exceed 33⅓ percent of the cost of the fishing vessel to be constructed may be paid under certain very restrictive conditions. Among these, is a requirement that the fishery in which the vessel will fish must be suffering injury or threat of injury by reason of increased imports of a like or similar product.

Other requirements are that the applicant possess the ability, experience; resources, and other qualifications necessary to enable the enterprise to operate successfully; that the vessel be suitable for use in the fishery and for use by the United States for national defense or military purposes during time of war or national emergency; that the vessel will deliver its full catch to ports of the United States except under "force majeure;" that only citizens or aliens legally domiciled in the United States will be employed on the vessel; and that the new vessel will aid in the development of the United States fisheries under conditions that the Secretary considers to be in the public interest.

The regulations as they appeared in the Federal Register follow:

Title 50—WILDLIFE

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBPART F—AID TO FISHERIES

PART 256—FISHING VESSEL CONSTRUCTION

Differential Subsidy Procedures

On page 7538 of the FEDERAL REGISTER of August 10, 1960, there was published a notice and text of a proposed new part, Part 166, Title 50, Code of Federal Regulations. Part 166 now has been changed to Part 256 in keeping with the format of the revised edition of 50 CFR—Wildlife, published in the FEDERAL REGISTER of September 1, 1960. The purpose of the new part is to issue regulations governing the payment of fishing vessel construction differential subsidies.

Interested persons were given 30 days within which to submit written comments, suggestions or objections with respect to the proposed new part. No comments, suggestions or objections have been received, and the proposed new part is hereby adopted with only an editorial change in the language of § 256.4 to provide more flexibility in the submission of detailed plans for the vessel proposed to be constructed. This new part shall become effective at the beginning of the 30th calendar day following the date of this publication in the FEDERAL REGISTER.

Part 256 reads as follows:

Sec.
256.1 Basis and purpose.
256.2 Definitions.
256.3 Eligibility requirements.
256.4 Applicants.
256.5 Subsidy contract.
256.6 Inspection of vessels.
256.7 Payment of subsidy.

AUTHORITY: §§ 256.1 to 256.7 issued under sec. 10, Pub. Law 86-516.

§ 256.1 Basis and purpose.

(a) The Act of June 12, 1960 (P.L. 86-516), authorizes the Secretary of the Interior to pay a subsidy for the construction of fishing vessels in shipyards of the United States.

(b) The purpose of this part is to prescribe rules and regulations governing the payment of these subsidies.

§ 256.2 Definitions.

(a) *Secretary.* The Secretary of the Interior or his authorized representative.

(b) *Administrator.* The Maritime Administrator in the Department of Commerce or his authorized representative.

(c) *Person.* Individual, association, partnership, or corporation, any one or all as the context requires.

(d) *Fishery.* A segment of the commercial fishing industry engaged in the catching of a single species or a group of species of fish or shellfish. To be considered as operating in a fishery the catch of such species during the calendar year must amount to at least fifty-one percent (51%) (in the aggregate by ex-vessel weight) of the total catch of the vessel.

§ 256.3 Eligibility requirements.

(a) Injury or threat of injury due to increased imports. Applicants for a subsidy for a vessel to be operated in a fishery which does not qualify under section 4(1) of the Act or which has not been previously found to be injured or threatened with injury by reason of increased imports must present evidence of injury or threat of injury by reason of increased imports. Upon receipt of such evidence, the Secretary will announce by notice in the FEDERAL REGISTER and by notice in writing by registered mail to parties of record, that factual data may be filed in support of or opposition to, such a finding during the succeeding 30 days. All data filed will be considered, along with such information as may be developed by the Secretary's staff or staffs of other Government agencies and a finding announced by the Secretary. This finding will remain in effect until the Secretary shall announce that he has reason to believe the injury has been remedied or the threat of injury removed. Interested parties will then have 30 days to submit data, after which the Secretary will determine whether or not the injury or threat of injury remains. Injury or threat of injury may be determined, without excluding other factors, by downward trend of production, employment, prices, profits, or wages in the domestic fishery concerned, or a decline in sales, an increase in imports, either actual or relative, a higher or growing inventory, or a decline in the proportion of the domestic market supplied by the domestic fishery concerned.

(b) Aid in the development of the United States fisheries. For a vessel to aid in the development of the United States fisheries under conditions that the Secretary considers to be in the public interest, the vessel must be a modern vessel which will tend to upgrade the fleet and, unless of completely new and advanced design, shall not operate in a fishery which the Secretary deems to have sufficient vessels to economically harvest either the maximum sustained yield of the fishery or the maximum amount which can be marketed in an orderly manner.

§ 256.4 Applications.

Applications for a subsidy shall be made on forms prescribed by the Secretary and shall be filed with the Director, Bureau of Commercial Fisheries, Washington, D.C. The applications must be accompanied by three copies of the cross section, outboard profile, and specifications of the proposed vessel. The Secretary may require such additional complete detailed construction plans as may be necessary after a review of the application and accompanying plans and specifications.

§ 256.5 Subsidy contract.

(a) A contract for the payment of the subsidy will take effect when all contracts between the applicant for such subsidy and the shipbuilder, who is to construct such vessel, have been approved by the Administrator and the subsidy contract has been signed by the Secretary and the applicant; and

(b) The contract shall contain a formula for the computation of the amount of the subsidy that shall be repaid to the Secretary in the event the vessel is operated in any fishery other than the particular fishery for which it was designed as defined in § 256.2(d).

§ 256.6 Inspection of vessels.

The Secretary or the Administrator shall have access at all times to all vessels which are being constructed under a contract providing for a construction subsidy provided for by the Act.

§ 256.7 Payment of subsidy.

The subsidy will be paid to the applicant after the vessel is completed and evidence of full payment to the shipyard constructing the vessel is presented; or jointly to the applicant and the shipyard upon completion and delivery of the vessel.

FRED G. AANDAHL,
Acting Secretary of the Interior.

SEPTEMBER 16, 1960.

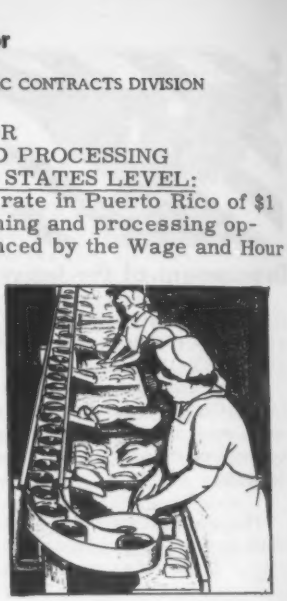
Note: Also see Commercial Fisheries Review, October 1960 p. 96.

Department of Labor

WAGE AND HOUR AND PUBLIC CONTRACTS DIVISION

MINIMUM WAGE FOR TUNA CANNING AND PROCESSING RAISED TO UNITED STATES LEVEL:

A minimum wage rate in Puerto Rico of $1 an hour for tuna canning and processing operations was announced by the Wage and Hour Division of the U. S. Department of Labor and published in the September 10, 1960, Federal Register. The wage order as published gives effect to recommendations of the U. S. Department of Labor Industry Committee No. 49-A for the Food and Related Products Industry in Puerto Rico. This raises the Puerto Rican wage rate to the same minimum level as that which prevails on the United States mainland.



The section of the order (which becomes effective September 25, 1960) titled "The yeast and canned tuna fish classification" as published states: "Wages at a rate of not less than $1.00 an hour shall be paid under section 6 of the Fair Labor Standards Act of 1938 by every employer to each of his employees in the food and related products industry in Puerto Rico who is engaged in commerce or in the production of goods for commerce who is also engaged in the yeast and canned tuna fish classification of that industry, which is defined as the manufacture of yeast, and the cooking and canning of tuna fish and of tuna-like fish and the manufacture of byproducts therefrom." A wage rate of 85 cents an hour has been in effect since November 17, 1958. The new wage order means an hourly increase of 15 cents. While the tuna canning and processing industry in Puerto Rico comes under the $1.00 an hour minimum wage, all other types of food canning and preserving have a wage rate of 80 cents an hour (previous rate was 70 cents), and other types of general food processing a rate of 85 cents (previous rate 75 cents) an hour under the new order.

The Fair Labor Standards Act as amended in 1958 provides special industry committees to biennially review and recommend minimum hourly wage rates for Puerto Rican industries operating at or below the $1.00-an-hour statutory minimum that applies on the mainland. The U. S. Department of Labor appointed Industry Committee No. 49-A to recommend hourly wage rates for the food and related products industry in Puerto Rico. The Committee held its public hearing on August 15 in San Juan, Puerto Rico, and recommended the increase in the minimum wage.

In the "Report, Findings of Fact, and Recommendations of Industry Committee No. 49-A for the Food and Related Products Industry in Puerto Rico," the Committee's findings and recommendations for the Yeast and Canned Tuna Classification were:

"This classification is presently composed of two establishments with 446 covered employees. One firm is a manufacturer of dry yeast employing 13 workers covered by the minimum wage provisions of the Fair Labor Standards Act, and the other manufactures canned tuna fish with a total of 433 covered employees. At the time of the 1958 survey these same two establishments employed a total of 367 covered workers. According to a witness testifying in behalf of a newly-organized firm, it is contemplated that several hundred additional persons will shortly be engaged in the production of canned tuna fish and byproducts. . . .

"Under the provisions of a union contract covering workers at the operating tuna fish cannery at the time of the Wage and Hour Division survey, wage rates ranged from 90 cents an hour to $1.65 an hour, and there was provision for an increase of 5 cents an hour for all job classifications on October 10, 1960. As a result of a recent election, the employees of this plant are now represented by another union. Average hourly earnings in the plant amounted to over 96 cents an hour at the time of the survey. A company representative appearing before the Committee stated that the company did not claim inability to absorb wage increases. The most recent data available to the Committee indicates that in 1957 the firm had a net profit of 7.1 percent on almost $5 million sales, and in 1958 it had a profit of 9.7 percent on sales of $5.6 million. From June 1, 1957, to May 30, 1959, the firm's earned surplus increased from $77,631 to $1,306,213.

"On the basis of the entire record, therefore, the committee finds that a minimum wage rate of $1.00 an hour for the Yeast and Canned Tuna Fish Classification is economically feasible at this time and that this rate will not result in a substantial curtailment of employment in the industry. It is obvious that since this is the statutory minimum rate presently applicable elsewhere in the United States, the recommended rate will not give industry in Puerto Rico a competitive advantage over industry in the United States outside of Puerto Rico. This minimum wage rate will directly affect about 82 percent of the workers in the classification and cause an estimated direct increase in the classification wage bill of about 7 percent. . . .

"Wages at a rate of not less than $1.00 an hour shall be paid in the Yeast and Canned Tuna Fish Classification of the Food and Related Products Industry, and this classification shall be defined as the manufacture of yeast, and the cooking and canning of tuna fish and of tuna-like fish and the manufacture of by-products therefrom. . . ."

Note: Also see Commercial Fisheries Review, Oct. 1960 p. 97, Jan. 1959 p. 82.

U. S. Tariff Commission

FINAL REPORT ON TARIFF SIMPLIFICATION STUDY ISSUED:

The U. S. Tariff Commission released on November 15, 1960, the final report on its tariff classification study. The report constitutes a recommendation to Congress for revision of the customs laws under which imported articles are classified for tariff purposes.

The study was undertaken by the Commission pursuant to Section 101 of the Customs Simplification Act of 1954. It was intended to lead to a proposal, for Congressional consideration, to simplify and modernize the tariff schedules. The study was not directly concerned with tariff rates.

The Tariff Commission's final report consisted of ten volumes, one of which was Schedule I--Animal and Vegetable Products. An early version of this volume was issued by the Commission in 1958 and was the subject of public hearings.

Note: Copies of each volume in the final report are available for purchase from the U. S. Government Printing Office.

* * * * *

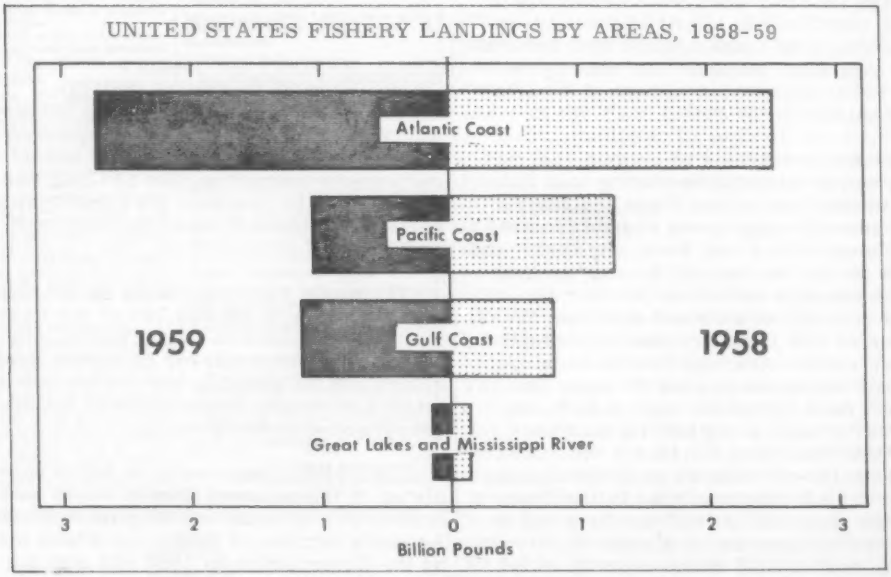
SHRIMP INDUSTRY INVESTIGATION:

In response to a resolution of the Senate Committee on Finance, the U. S. Tariff Commission, under the authority of section 332 of the Tariff Act of 1930, as amended (19 U.S.C. 1332), on September 12 announced and instituted an investigation of the domestic shrimp industry (including fishing, processing, and other related operations), and of imports of shrimp and shrimp products provided for in paragraph 1761 of the Tariff Act of 1930.

The resolution directs the Commission to include in its report to the Committee on Finance the facts relative to United States and world production, and trade; imports; domestic supplies and consumption; the possibilities of world over-production; the interests of consumers, processors, and producers; foreign and domestic wage rates; costs of transportation to principal consuming centers; supplies of shrimp available to domestic and foreign fishermen; and other pertinent factors.

The resolution also directs the Commission to include in its report an analysis of the possible results of an imposition of a duty of 35 percent on all imports of shrimp and shrimp products as provided in paragraph 1761 of the Tariff Act of 1930 as well as an analysis of the possible results of a tariff quota under which all imports not in excess of the imports in the calendar year 1960 shall enter free of duty and all imports in excess of those in 1960 shall be dutiable at 50 percent ad valorem.

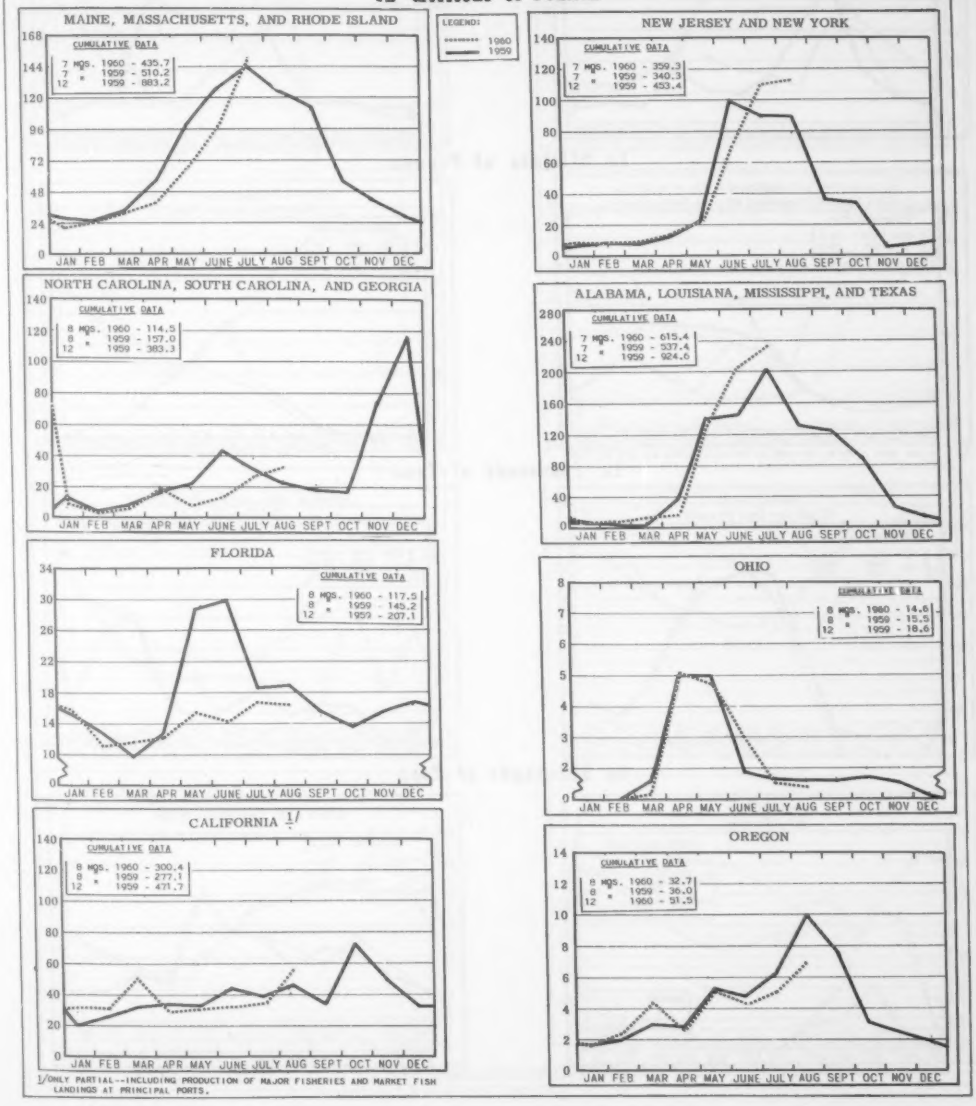
A public hearing, at which interested parties will be given opportunity to be present and to be heard, will be held in connection with the investigation in the Hearing Room of the Tariff Commission, Washington, D. C., beginning on January 9, 1961. (Notice published in Federal Register of September 15, 1960.)



FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

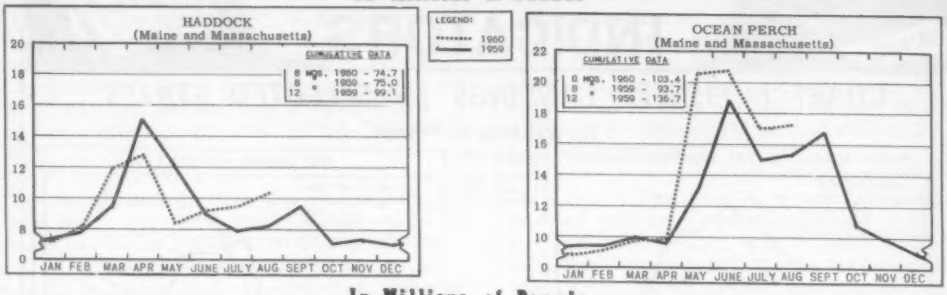
In Millions of Pounds


MAINE, MASSACHUSETTS, AND RHODE ISLAND
CUMULATIVE DATA
7 MOS. 1960 - 435.7
7 " 1959 - 510.2
12 " 1959 - 883.2
LEGEND:
1960
1959
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
NEW JERSEY AND NEW YORK
CUMULATIVE DATA
7 MOS. 1960 - 359.3
7 " 1959 - 340.3
12 " 1959 - 453.4
NORTH CAROLINA, SOUTH CAROLINA, AND GEORGIA
CUMULATIVE DATA
8 MOS. 1960 - 114.5
8 " 1959 - 157.0
12 " 1959 - 383.3
ALABAMA, LOUISIANA, MISSISSIPPI, AND TEXAS
CUMULATIVE DATA
7 MOS. 1960 - 615.4
7 " 1959 - 537.4
12 " 1959 - 924.6
FLORIDA
CUMULATIVE DATA
8 MOS. 1960 - 117.5
8 " 1959 - 145.2
12 " 1959 - 207.1
OHIO
CUMULATIVE DATA
8 MOS. 1960 - 14.6
8 " 1959 - 15.5
12 " 1959 - 18.6
CALIFORNIA 1/
CUMULATIVE DATA
8 MOS. 1960 - 300.4
8 " 1959 - 277.1
12 " 1959 - 471.7
OREGON
CUMULATIVE DATA
8 MOS. 1960 - 32.7
8 " 1959 - 36.0
12 " 1960 - 51.5

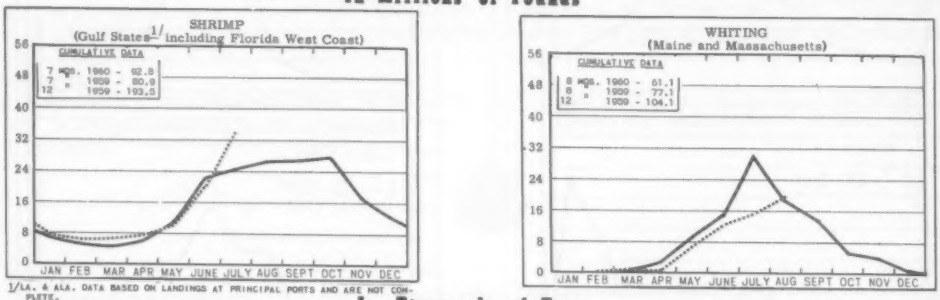
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

In Millions of Pounds

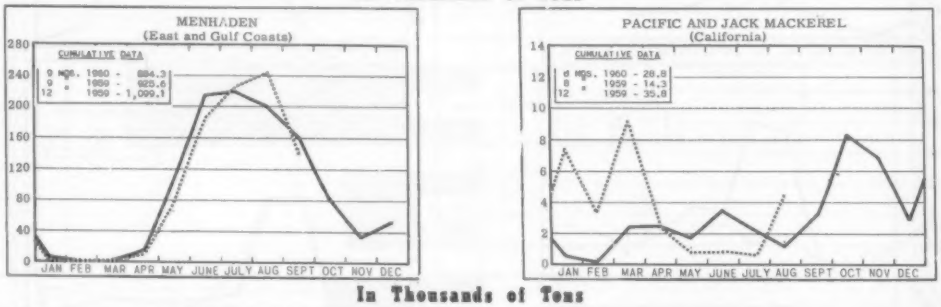


In Millions of Pounds


SHRIMP
(Gulf States 1/ including Florida West Coast)
CUMULATIVE DATA
7 MOS. 1960 - 92.8
7 " 1959 - 80.9
12 " 1959 - 193.5
WHITING
(Maine and Massachusetts)
CUMULATIVE DATA
8 MOS. 1960 - 61.1
8 " 1959 - 77.1
12 " 1959 - 104.1
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.

In Thousands of Tons


MENHADEN
(East and Gulf Coasts)
CUMULATIVE DATA
9 MOS. 1960 - 884.3
9 " 1959 - 925.6
12 " 1959 - 1,099.1
PACIFIC AND JACK MACKEREL
(California)
CUMULATIVE DATA
8 MOS. 1960 - 28.9
8 " 1959 - 14.3
12 " 1959 - 35.8
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

In Thousands of Tons

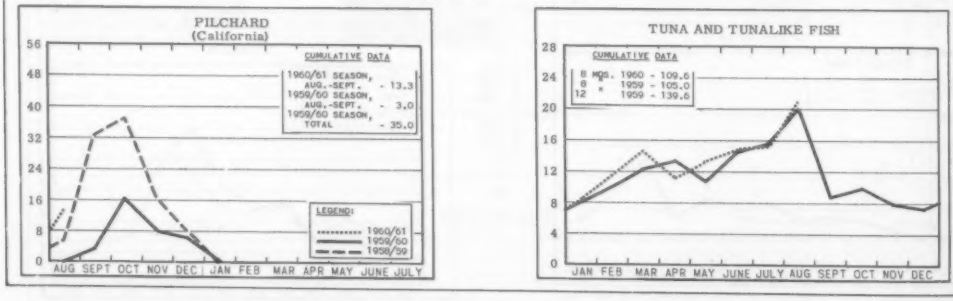
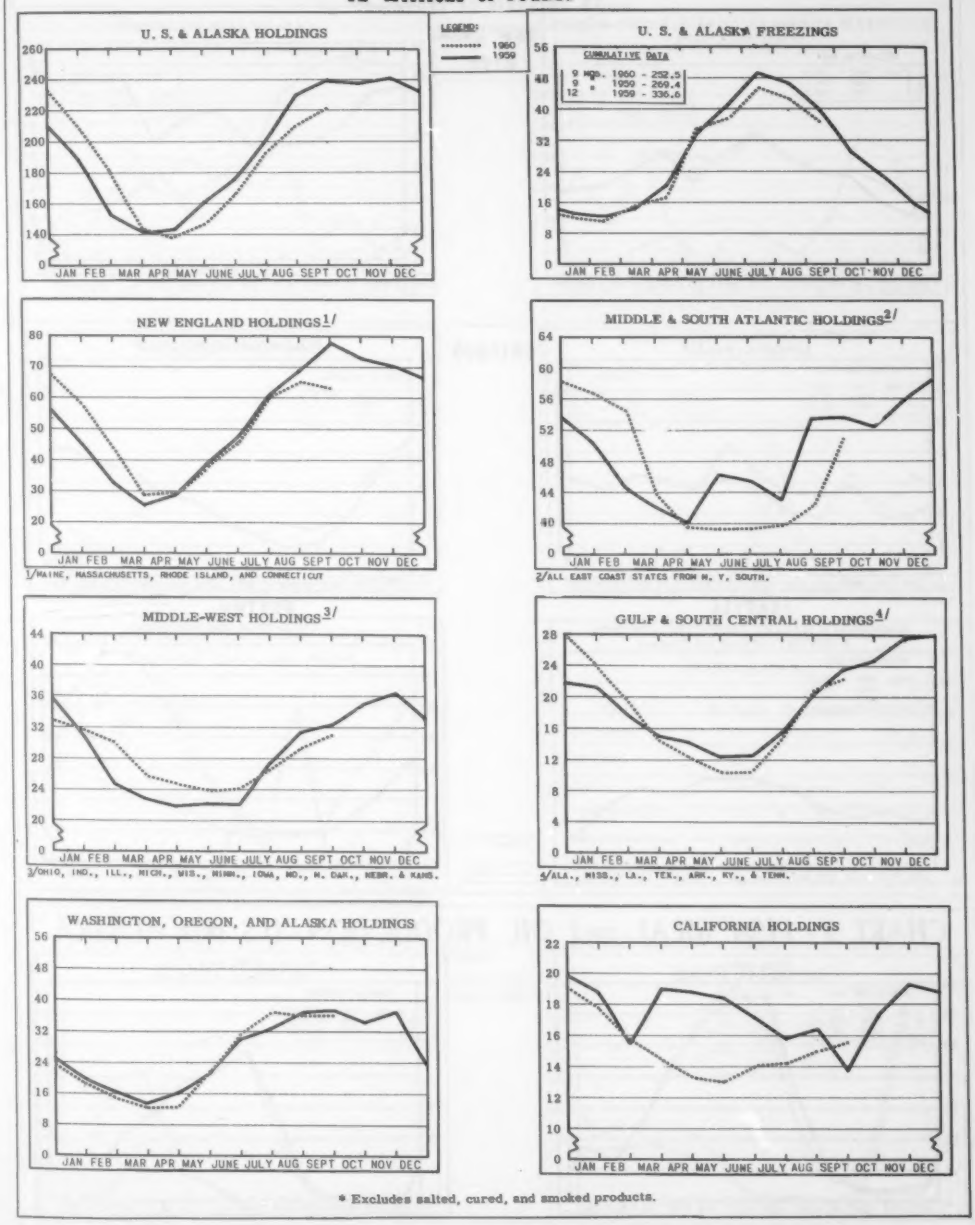

PILCHARD
(California)
CUMULATIVE DATA
1960/61 SEASON, AUG.-SEPT. - 13.3
1959/60 SEASON, AUG.-SEPT. - 3.0
1959/60 SEASON, TOTAL - 35.0
LEGEND:
1960/61
1959/60
1958/59
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY
TUNA AND TUNALIKE FISH
CUMULATIVE DATA
8 MOS. 1960 - 109.6
8 " 1959 - 105.0
12 " 1959 - 139.6
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

In Millions of Pounds


U. S. & ALASKA HOLDINGS
LEGEND:
1960
1959
U. S. & ALASKA FREEZINGS
CUMULATIVE DATA
9 MOS. 1960 - 252.5
9 " 1959 - 269.4
12 " 1959 - 336.6
NEW ENGLAND HOLDINGS 1/
MIDDLE & SOUTH ATLANTIC HOLDINGS 2/
MIDDLE-WEST HOLDINGS 3/
GULF & SOUTH CENTRAL HOLDINGS 4/
WASHINGTON, OREGON, AND ALASKA HOLDINGS
CALIFORNIA HOLDINGS
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC

1/ MAINE, MASSACHUSETTS, RHODE ISLAND, AND CONNECTICUT

2/ ALL EAST COAST STATES FROM N. Y. SOUTH.

3/ OHIO, IND., ILL., MICH., WIS., MINN., IOWA, MO., N. DAK., NEBR. & KANS.

4/ ALA., MISS., LA., TEX., ARK., KY., & TENN.

* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

In Millions of Pounds

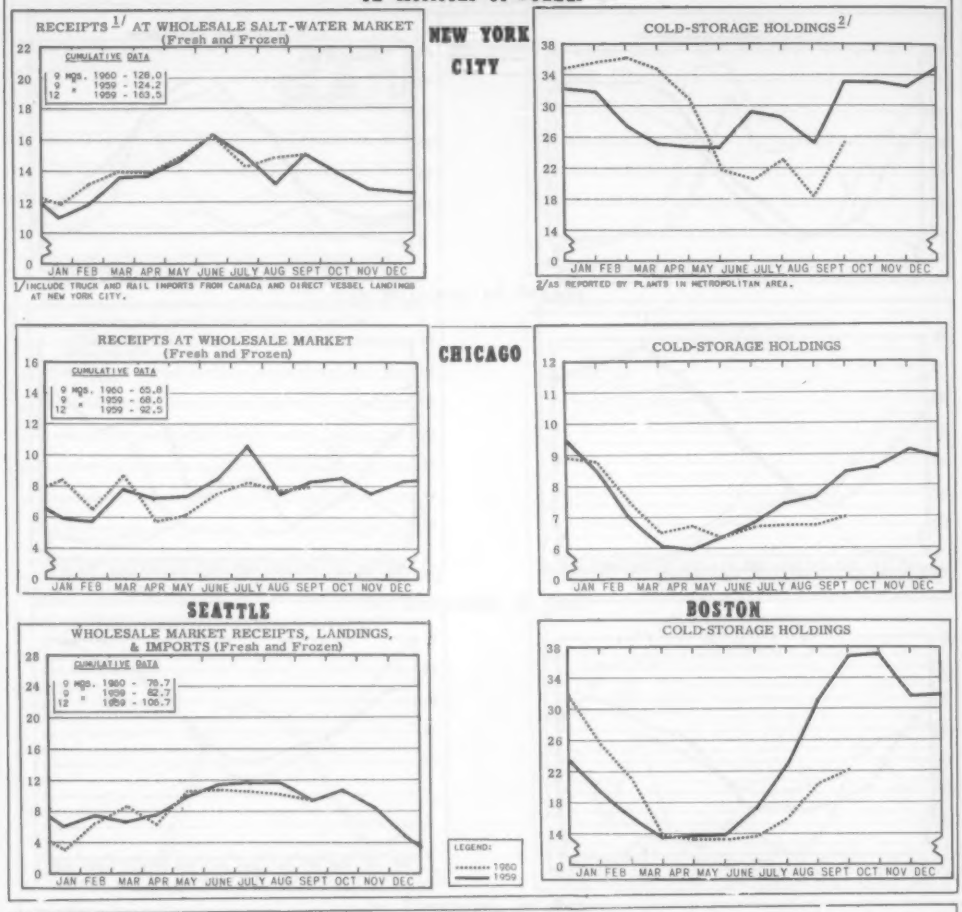

RECEIPTS 1/ AT WHOLESALE SALT-WATER MARKET (Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1960 - 126.0
9 " 1959 - 124.2
12 " 1959 - 163.5
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1/INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.
NEW YORK CITY
COLD-STORAGE HOLDINGS 2/
2/AS REPORTED BY PLANTS IN METROPOLITAN AREA.
RECEIPTS AT WHOLESALE MARKET (Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1960 - 65.8
9 " 1959 - 68.6
12 " 1959 - 92.5
CHICAGO
COLD-STORAGE HOLDINGS
SEATTLE
WHOLESALE MARKET RECEIPTS, LANDINGS, & IMPORTS (Fresh and Frozen)
CUMULATIVE DATA
9 MOS. 1960 - 78.7
9 " 1959 - 82.7
12 " 1959 - 106.7
BOSTON
COLD-STORAGE HOLDINGS
LEGEND:
1960
1959

CHART 5 - FISH MEAL and OIL PRODUCTION - U.S and ALASKA

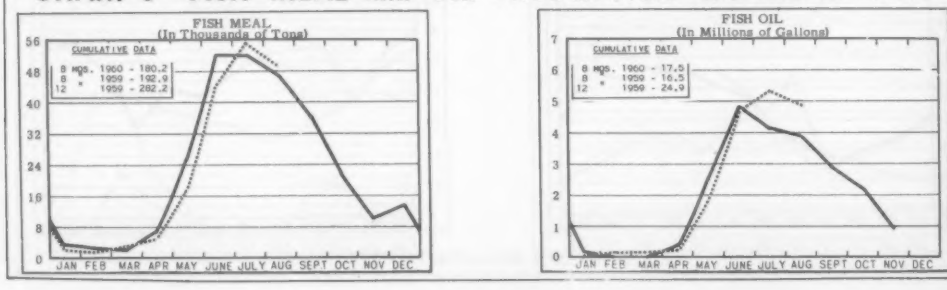
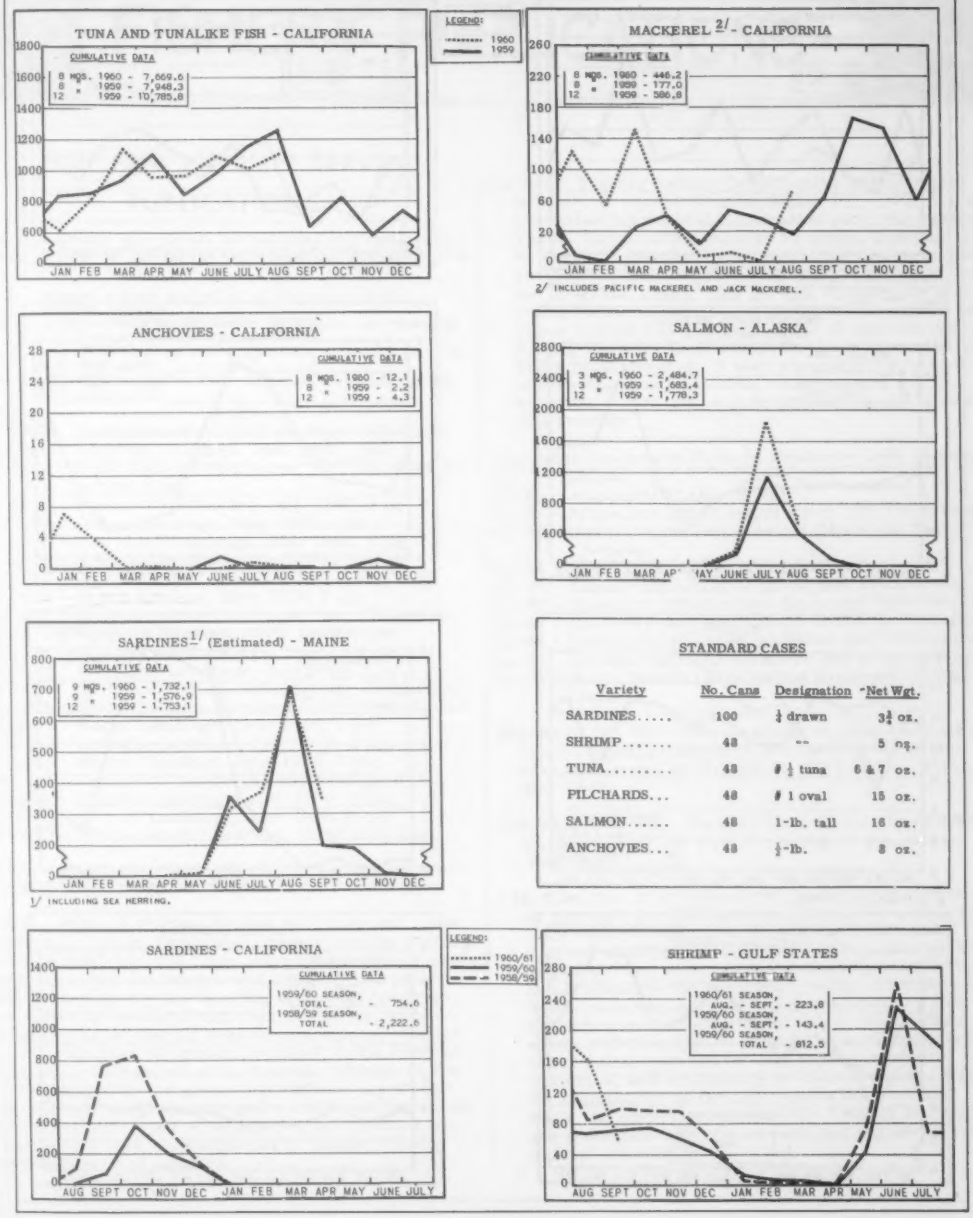

FISH MEAL (In Thousands of Tons)
CUMULATIVE DATA
8 MOS. 1960 - 180.2
8 " 1959 - 192.9
12 " 1959 - 282.2
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
FISH OIL (In Millions of Gallons)
CUMULATIVE DATA
8 MOS. 1960 - 17.5
8 " 1959 - 16.5
12 " 1959 - 24.9

CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases


TUNA AND TUNALIKE FISH - CALIFORNIA
CUMULATIVE DATA
6 MOS. 1960 - 7,669.6
8 " 1959 - 7,948.3
12 " 1959 - 10,785.8
LEGEND:
1960
1959
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
MACKEREL 2/ - CALIFORNIA
CUMULATIVE DATA
6 MOS. 1960 - 446.2
8 " 1959 - 177.0
12 " 1959 - 586.8
ANCHOVIES - CALIFORNIA
CUMULATIVE DATA
8 MOS. 1960 - 12.1
8 " 1959 - 2.2
12 " 1959 - 4.3
SALMON - ALASKA
CUMULATIVE DATA
3 MOS. 1960 - 2,484.7
3 " 1959 - 1,683.4
12 " 1959 - 1,778.3
SARDINES 1/ (Estimated) - MAINE
CUMULATIVE DATA
9 MOS. 1960 - 1,732.1
9 " 1959 - 1,576.9
12 " 1959 - 1,753.1
SARDINES - CALIFORNIA
CUMULATIVE DATA
1959/60 SEASON, TOTAL - 754.6
1958/59 SEASON, TOTAL - 2,222.8
LEGEND:
1960/61
1959/60
1958/59
AUG SEPT OCT NOV DEC JAN FEB MAR APR MAY JUNE JULY
SHRIMP - GULF STATES
CUMULATIVE DATA
1960/61 SEASON, AUG. - SEPT. - 223.8
1959/60 SEASON, AUG. - SEPT. - 143.4
1959/60 SEASON, TOTAL - 812.5

2/ INCLUDES PACIFIC MACKEREL AND JACK MACKEREL.

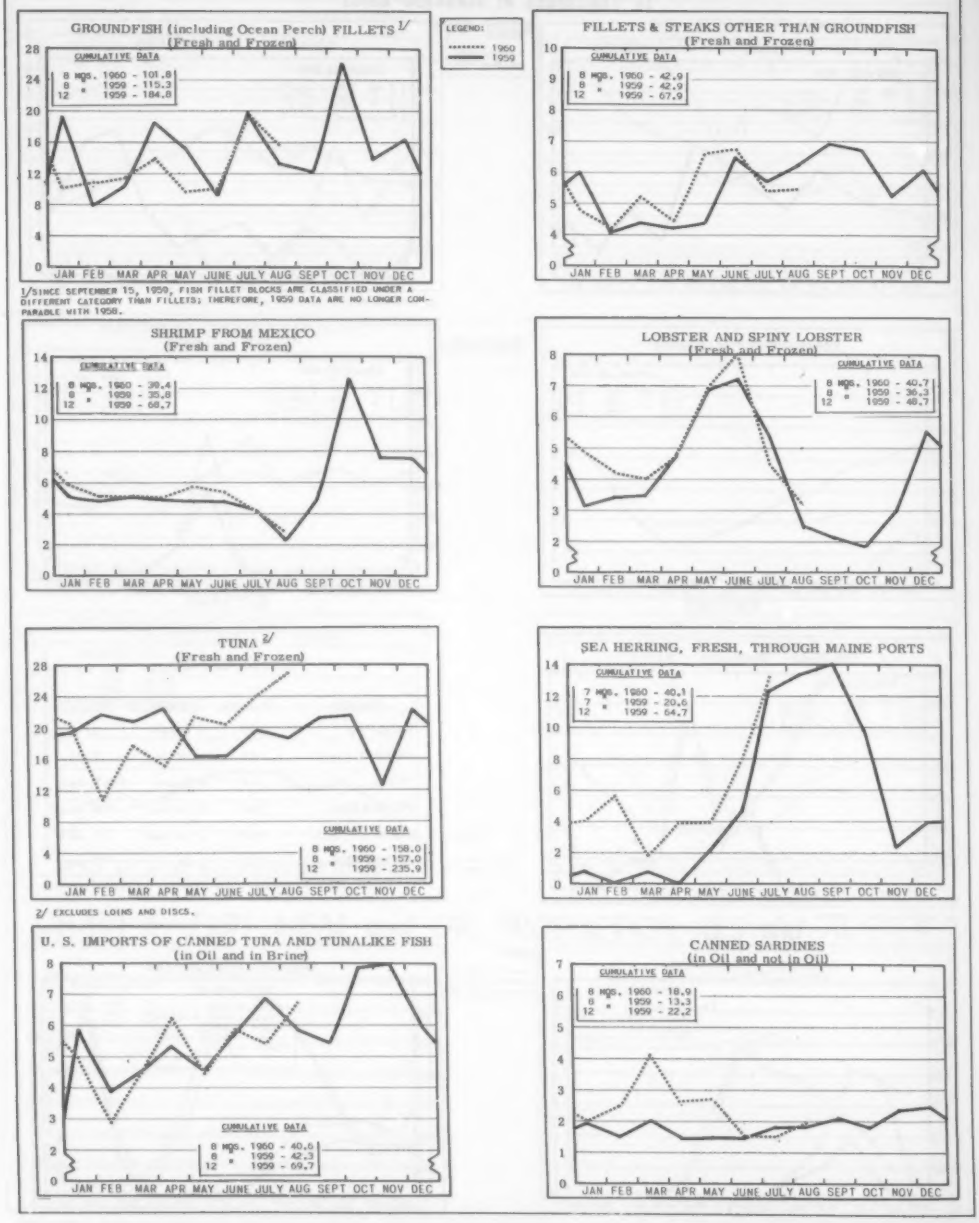
1/ INCLUDING SEA HERRING.

STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	¼ drawn	3¾ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.

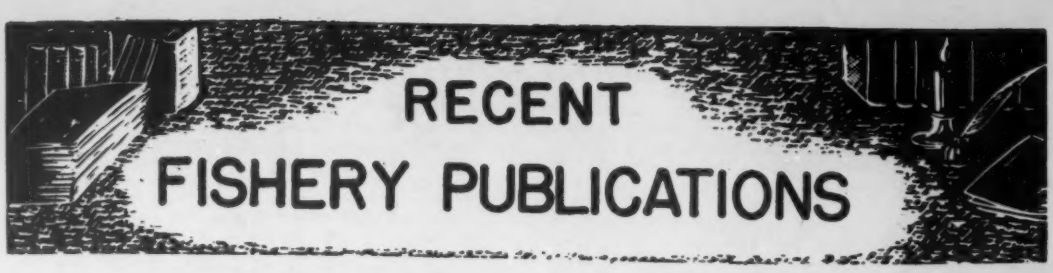
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds


GROUNDFISH (including Ocean Perch) FILLETS 1/
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1960 - 101.8
8 " 1959 - 115.3
12 " 1959 - 184.8
LEGEND:
1960
1959
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
FILLETS & STEAKS OTHER THAN GROUNDFISH
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1960 - 42.9
8 " 1959 - 42.9
12 " 1959 - 67.9
SHRIMP FROM MEXICO
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1960 - 30.4
8 " 1959 - 35.8
12 " 1959 - 68.7
LOBSTER AND SPINY LOBSTER
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1960 - 40.7
8 " 1959 - 36.3
12 " 1959 - 48.7
TUNA 2/
(Fresh and Frozen)
CUMULATIVE DATA
8 MOS. 1960 - 158.0
8 " 1959 - 157.0
12 " 1959 - 235.9
SEA HERRING, FRESH, THROUGH MAINE PORTS
CUMULATIVE DATA
7 MOS. 1960 - 40.1
7 " 1959 - 20.6
12 " 1959 - 64.7
U. S. IMPORTS OF CANNED TUNA AND TUNALIKE FISH
(in Oil and in Brine)
CUMULATIVE DATA
8 MOS. 1960 - 40.6
8 " 1959 - 42.3
12 " 1959 - 69.7
CANNED SARDINES
(in Oil and not in Oil)
CUMULATIVE DATA
8 MOS. 1960 - 18.9
8 " 1959 - 13.3
12 " 1959 - 22.2

1/ SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1958.

2/ EXCLUDES LOINS AND DISCS.



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
SL - BRANCH OF STATISTICS LIST OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR.- FISH. - SPECIAL SCIENTIFIC REPORTS- FISHERIES (LIMITED DISTRIBUTION).
SEP.- SEPARATES(REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number — Title

CFS-2363 - Massachusetts Landings, May 1960, 5 pp.
CFS-2365 - Virginia Landings, June 1960, 3 pp.
CFS-2369 - South Atlantic Fisheries, 1959 Annual Summary, 6 pp.
CFS-2370 - Frozen Fish Report, July 1960, 8 pp.
CFS-2372 - Maine Landings, May 1960, 3 pp.
CFS-2373 - New York Landings, June 1960, 4 pp.
CFS-2375 - Shrimp Landings, May 1960, 6 pp.
CFS-2376 - Rhode Island Landings, June 1960, 3 pp.
CFS-2382 - Ohio Landings, June 1960, 2 pp.
CFS-2377 - Massachusetts Landings, June 1960, 5 pp.
CFS-2378 - Virginia Landings, July 1960, 3 pp.
CFS-2379 - Mississippi Landings, May 1960, 2 pp.
CFS-2380 - Maryland Landings, July 1960, 3 pp.
CFS-2381 - North Carolina Landings, July 1960, 3 pp.
CFS-2383 - South Carolina Landings, July 1960, 2 pp.
CFS-2384 - Texas Landings, June 1960, 3 pp.
CFS-2385 - Georgia Landings, July 1960, 2 pp.
CFS-2386 - Maine Landings, June 1960, 3 pp.
CFS-2387 - California Landings, May 1960, 4 pp.
CFS-2389 - Florida Landings, July 1960, 7 pp.
CFS-2391 - Shrimp Landings, June 1960, 6 pp.
CFS-2392 - Rhode Island Landings, July 1960, 3 pp.

FL-336ss - Commercial Fisheries Outlook, July-September 1960, 44 pp.

FL-499 - Federal Fishing Vessel Mortgage and Loan Insurance, 14 pp., July 1960. Describes the Fishing Vessel Mortgage and Loan Insurance Program administered by the Bureau of Commercial Fisheries. This provides for the insuring of mortgages given to assist the construction, reconstruction, and reconditioning of fishing vessels in a manner similar to the mortgage insurance provided by the Federal Housing Administration for houses. Discusses the authority for the program, its purpose, credit requirements, eligible mortgages and loans, premium rates for both types of insurance, applications, investigation fees, commitments to insure, closing procedures, and defaults.

FL-503 - Fishing Vessel Construction Differential Subsidy, 12 pp., processed, September 1960. A leaflet containing general information about the Fishing Vessel Construction Subsidy Program, administered by the U. S. Bureau of Commercial Fisheries. Describes the enacting of the enabling legislation for the program, Public Law 86-516; its purpose of providing financial assistance to correct inequities between foreign and domestic costs of construction of fishing vessels; applications for benefits; and eligibility requirements. It also presents details on the processing of applications; requirements for construction of vessels; and determination and payment of a subsidy.

Wholesale Dealers in Fishery Products, 1959 (Revised):
SL- 1 - Maine.
SL-24 - Minnesota (Lakes Area).
SL-32 - Minnesota (Mississippi River and Tributaries).
SL-33 - North Dakota (Mississippi River and Tributaries).
SL-36 - Iowa (Mississippi River and Tributaries).
SL-37 - Kansas (Mississippi River and Tributaries).
SL-38 - Missouri (Mississippi River and Tributaries).
SL-42 - Kentucky (Mississippi River and Tributaries).
SL-44 - Nebraska (Mississippi River and Tributaries).
SL-48 - Indiana (Mississippi River and Tributaries).
SL-49 - South Dakota (Mississippi River and Tributaries).

SSR-Fish. No. 325 - Observations on Habits and a Method of Trapping Channeled Whelks Near Chatham, Massachusetts, by William N. Shaw, 9 pp., illus., May 1960.

SSR-Fish. No. 340 - Further Experiments in Fishway Capacity, 1957, by Carl H. Elling, 18 pp., illus., May 1960.

SSR-Fish. No. 343 - Manufacturing Plant Food Services as Markets for Fish and Shellfish, 35 pp., May 1960. This report identifies and examines the market for fish and shellfish afforded the fishing industry by the employee food services maintained by manufacturing establishments for their employees. Important differences in the use of fish and shellfish are found, depending on number of employees, location or plant, species of fish, type of product, and other factors. Other points covered include buying practices, inventories, and availability of freezer space. Careful examination of the data leaves no doubt that, while the survey period was for 4 weeks in January and February 1956, the results are pertinent to the current situation.

SSR-Fish. No. 346 - Species Composition of Industrial Trawl-Fish Landings in New England, 1958, by Robert L. Edwards and Lewis Lawday, 22 pp., illus., June 1960. Presents data on the species composition of the industrial trawl-fish catch landed in 1958 at the New England ports of Point Judith, R. I., and New Bedford and Gloucester, Mass. The information given covers percent by weight and pounds landed for each of the principal fishing areas, by month and port.

SSR-Fish. No. 349 - Chemical Analyses of Marine and Estuarine Waters Used by the Galveston Biological Laboratory, by Kenneth T. Marvin and others, 16 pp., June 1960.

Sep. No. 600 - Development and Use of Otter-Trawling Gear for Red Snapper Fishing in the Gulf of Mexico, June 1957-May 1959.

Sep. No. 601 - Structure of the Fishing Industry in the European Common Market.

(International North Pacific Fisheries Commission) United States Section Meeting, March 1960, Circular 85, 32 pp., illus., May 1960. Includes a brief discussion of the International North Pacific Fisheries Commission and its work. Also includes the following papers presented before a joint session of the Alaska Legislature on March 4, 1960: "Statement of the United States Section, International North Pacific Fisheries Commission," by Milton E. Brooding; Scientific Research by the United States," by J. L. McHugh; "Research Related to the Case for Abstention," by R. A. Fredin; "Distribution and Racial Composition of Salmon on the High Seas," by Clinton E. Atkinson; and "Pacific Salmon in International Waters," by Allan C. Hartt.

Survey of Fishing in 1000 Ponds in 1959, by Willis King, Circular 86, 24 pp., illus., May 1960. Reports the results of a survey conducted to determine how much recreational fishing our national fish hatcheries are furnishing by providing warm-water fish to stock farm and ranch ponds. Findings show that one-fourth of all persons fishing in fresh water in 1959 fished at least once in a pond that had been stocked by the Bureau of Sport Fisheries and Wildlife. Between 30,000 and 40,000 ponds are stocked annually with fish produced at the national fish hatcheries. Largemouth bass and bluegill sunfish were the primary species used in the stocking program while red-ear sunfish and bluegills were stocked in the southeastern States and channel catfish in 155 ponds in the southwest. More than 20 million man-days of recreational fishing were provided in 1959 to at least 5 million persons as a result of the farm-pond fish-stocking program, the survey showed.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-29	Union of South Africa Pilchard/Maasbanker Fish Meal and Oil Reduction Plants.
MNL-30	Venezuelan Reduction Plants.
MNL-31	Moroccan Reduction Plants.
MNL-32	Venezuelan Commercial Catch, Production of Processed Fishery Products, and Foreign Trade for 1958 and 1959.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

(Baltimore) Monthly Summary - Fishery Products, March and April 1960, 9 and 8 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts at Baltimore by species and by states and provinces for fresh- and salt-water fish and shellfish; total receipts by species and comparisons with previous years; and wholesale prices on the Baltimore market; for the months indicated.

California Fishery Products Monthly Summary, Part I--Fishery Products Production and Market Data, July and August 1960; 14 and 15 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel and anchovies; pack of canned tuna, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; for the months indicated.

(Chicago Monthly Summary of (Chicago's) Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, August 1960, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6 Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; and wholesale prices for fresh and frozen fishery products; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, August 1960, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for July 1960, 19 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products; range of prices of fresh-water fish in Peck Slip, Jan.-July 1960; and marketing trends; for the month indicated.

Receipts and Prices of Fresh and Frozen Fishery Products at Chicago, 1959, by G. A. Albano, 65 pp., September 1960. (Available free from the Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) In the analysis of receipts of fishery products at Chicago, the author discusses the changes in receipts of various species from previous years. He also discusses sources of receipts; fishery products carload receipts at Chicago; trends in fishery products transportation; receipts by months, species, and varieties; and lake trout and whitefish fisheries and receipts. Other topics covered are trends in Great Lakes commercial fishery, imports of fresh and frozen fresh-water fish from Canada, imports of

selected frozen fishery products, cold-storage inventories, frozen shrimp market trends, U. S. shrimp landings and imports, and standards for grades of frozen raw headless shrimp. Also included is a table giving the names, classifications, and approximate weights of certain fishery products as used in the Chicago wholesale markets. The second section presents statistical data on fresh and frozen fishery products receipts at Chicago by species and by states and provinces of origin, states and provinces by species, species by months, states and provinces by months, totals by species, and totals by states and provinces. Receipts are tabulated by method of transportation (truck, express, and freight). A table shows the monthly range of wholesale prices of some of the leading varieties of fresh and frozen fishery products handled in the Chicago market.

Special Conference with the Fishing Industry on Export Trade Promotion, June 20, 1960, 14 pp., processed. (Branch of Foreign Fisheries and Trade, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Washington 25, D. C.) A report on a special conference with the fishing industry on export trade promotion, held on June 20, 1960, in Washington, D. C. This report, consisting of summary minutes, lists the industry and Government representatives present and discusses the purpose of the meetings, foreign tariffs, quantitative restrictions, promotion of U. S. exports, and work of the Federal Trade Commission. It also covers assistance of the Export-Import Bank, duties of the Regional Fisheries Officer for Latin America, promotion of U. S. fishery products, and presentation of several fishery problems by industry representatives. A summary of fishing industry recommendations to increase U. S. exports is included.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

"Use of a Small Otter Trawl to Sample Deep-Water Fishes in Maine Lakes," by Robert S. Rupp and Stuart E. DeRoche, article, Progressive Fish-Culturist, vol. 22, no. 3, July 1960, pp. 134-137, illus., processed, 25 cents.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ANCHOVY:

"The Ripening Process of Anchovy," article, Redogorelse for Arbetsaret July 1, 1958-June 30, 1959, SIK Report No. 71, p. 36, printed in Swedish. Svenska Institute for Konserveringsforskning, Goteborg, Sweden, 1959.

ANTIBIOTICS

"Effectiveness of Dip in Iced Chlortetracycline (CTC)-Containing Sea Water on Keeping Quality of Mackerel Aboard Ship and Determination of CTC Residues on the Fish," by Tetuo Tomiyama and Yasuo Yone, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, August 1959, pp. 290-293, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

ANTIBIOTICS:

"Questions of the Availability of Ice as Carrier of Chemical Preservatives--an Examination with Chlortetracycline," by K. Higashi and others, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 11, 1959, pp. 920-924, printed in Japanese with English summary. Japanese Society of Scientific Fisheries, Shiba-kaigandori 6-chome Tokyo, Japan.

ARGENTINA:

"La Pesca en la Republica Argentina" (The Fishery in Argentina), by A. B. Sailor, article, Puntal, vol. 7, no. 74, May 1960, pp. 11-12, illus., printed in Spanish. Puntal, Ramon y Cajal 3, Apartado 316, Alicante, Spain.

BIOCHEMISTRY:

"Sodium Content of Fish Flesh," by Claude E. Thurston and Kathryn L. Osterhaug, article, Journal of the American Dietetic Association, vol. 36, March 1960, pp. 212-215, printed. American Dietetic Association, 620 N. Michigan Ave., Chicago 11, Ill.

CANADA:

Canadian Commercial Fish Landings of Eastern, Central, and Western Lake Erie, 1870-1958, by James W. Davies, 87 pp., illus., processed. Department of Lands and Forests, Parliament Buildings, Toronto 5, Canada. Production statistics taken from official records of the Canadian fishing industry in Lake Erie are presented by species, in tabular and graphical form for (a) Essex County, including the Pelee Island fishery; (b) Kent and Elgin Counties; and (c) Norfolk, Haldimand, and Welland Counties, including the Niagara River above the Falls, and including the Grand River from 1876 to 1904, and 1913 to 1922.

List of the Marine Fishes of Canada, by D. E. McAllister, Bulletin No. 168, National Museum of Canada, printed, C$1.25 (about US$1.29). Queen's Printer and Controller of Stationery, Ottawa, Canada. Includes all species of fishes recorded as occurring in the brackish and marine waters of Canada. In general, only fishes of the Continental Shelf and offshore fishing banks are listed. Names are listed alphabetically under the family or subfamily. The scientific name is followed by its author and date of publication.

Operations of Longliners and Draggers, Atlantic Seaboard, 1952-1958, by John Proskie, Primary Industry Studies no. 1, vol. 8, part 1, 110 pp., illus., processed. The Queen's Printer and Controller of Stationery, Ottawa, Canada, 1960. This is the first part of the eighth annual progress report on the study of modern fishing craft on the Atlantic seaboard. It reviews the impact of the modernization policy on the groundfish industry; strengths and weaknesses of the policy are appraised in terms of accomplishments to the end of 1958 and in terms of types and sizes of craft most suitable and successful in their operations. Trends established since the inception of the study are presented in chart form for the most important input-output factors affecting the profitability of the enterprises studies.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Also, tables are presented summarizing trends in average landings per enterprise by quantity and value of species as well as for the average prices received by fishermen.

Operations of Modern Longliners and Draggers, Atlantic Seaboard, 1958, by John Proskie, Primary Industry Studies no. 1, vol. 8, part 2, 68 pp., illus., processed. The Queen's Printer and Controller of Stationery, Ottawa, Canada, 1959. The second part of the eighth annual progress report on a study of the economics of modern fishing-craft operations in the Atlantic provinces. The tables provide a comparison of the findings obtained from the detailed accounts of 134 fishing enterprises for the 1958 season. The data include capital and operating costs, as well as returns to labor, capital, and management. The length of the fishing season and the intensity of the fishing effort are related to grounds worked, volume of output, and species landed.

Summary Statistics of Canada's Fisheries, 1939-1958, 39 pp., printed. (Reprinted from Canadian Fisheries Annual, 1960, pp. 60-98.) Canadian Fisheries Annual, Gardenvale, Quebec, Canada. Statistics are presented in 8 sections on landings and value of Canadian fisheries and related data: (1) summary statistics for 1949-1959; (2) East Coast fisheries; (3) fresh-water fisheries; (4) West Coast fisheries; (5) fillet production; and (6), (7) and (8) exports and imports. Also included are a list of addresses of fishing companies and a directory of fishery products by type, such as fresh and frozen fish (whole or dressed), fresh and frozen fish (filleted), smoked fish (dressed or filleted), cured fish, canned fish (not including shellfish), shellfish (in shell or meat--not canned), canned shellfish, fish oils and fish livers, fish meal, and other fishery products. Listed under each classification are the companies which process that particular product. Data are mostly for 1958, although some 1959 figures are given.

CANNING:
Canning," article, Food Investigation 1957, pp. 20-21, printed. Department of Scientific and Industrial Research, London, England, 1958. (Available from Her Majesty's Stationery Office, York House, Kingsway, W. C. 2, England.) Describes studies for improving the quality of canned herring with regard to flavor and texture which are being carried out at the Torry Research Station, Aberdeen, Scotland, by the British Food Manufacturing Industries Association. The minor extractives that are largely responsible for odor and flavor in both raw and cooked herring meat are the subject of this study.

"Research on the Resistance of Tinplate to Corrosion," by S. C. Britton, article, Chemistry and Industry No. 7, February 13, 1960, pp. 158-163, printed. Chemistry and Industry, 14 Belgrave Square, London W1, England.

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Cultivo de la Carpa Seleccionada en Mexico (Selected Carp Culture in Mexico), by Fernando Obregon, 64 pp., illus., printed in Spanish. Secretario de Agricultura y Ganaderia, Calle de Tacuba 7, Mexico, D. F., Mexico, 1960.

CHESAPEAKE BAY:
Chesapeake Science, vol. 1, no. 1, April 1960, 77 pp., illus., printed, single copy 75 cents, annual subscription $2. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md. The first issue of a new publication devoted to presenting the results of research and management studies dealing with the natural resources of the Chesapeake Bay region and other technical papers on related subjects. The publications, issued periodically, proposes to publish short papers and notes. Participation is solicited by research centers, colleges, universities, and scientific societies in the Chesapeake Bay region. Includes, among others, the following articles: "Evaluation of a Method of Reducing the Powering Requirements of Soft-Shelled Clam Dredging," by J. H. Manning and A. McIntosh Kennison; "Comparison of the Movements of Stocked and Resident Yellow Perch, Perca flavescens, in Tributaries of Chesapeake Bay, Maryland," by Romeo Mansueti; "Preliminary Report on Attracting Fish by Oyster-Shell Plantings in Chincoteague Bay, Maryland," by John Arve; "Supplemental Survey of Soft-Shelled Clam Bottoms in Tidewater Somerset County, Maryland," by H. T. Pfitzenmeyer; "Notes on the Soft-Shell Turtle (Trionyx) in Maryland Waters," by Romeo Mansueti and David H. Wallace; "Mass Mortality of the Starfish, Asterias forbesi, on the Atlantic Coast of Maryland," by Fred W. Sieling; and "Availability of Striped Bass during Summers of 1958 and 1959 as Reflected in Commercial Seine Catch," by George J. Murphy.

COD:
"Cod from Norway. II--Klipfish and Stockfish," by A. E. Hammond, article, Food, vol. 28, no. 334, 1959, pp. 256-258, illus., printed. Food, Tothill Press Ltd., 33 Tothill St., London S. W. 1, England.

COD FILLETS:
"The Effect of Time and Temperature of Cooking on the Palatability and Cooking Losses of Frozen Atlantic Codfish Fillets," by Iva L. Armstrong and others, article, Journal of the Fisheries Research Board of Canada, vol. 17, January 1960, pp. 1-7, printed. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

CRUSTACEANS:
"Paper Chromatographic Studies on the Fatty Acid Composition of Some Fresh Water Crustaceans," by T. Farkas and S. Herodek, article, Acta Biologica Academiae Scientiarum Hungaricae, vol. 10, 1959, pp. 85-90, illus., printed. Acta Biologica Academiae Scientiarum Hungaricae, Magyar Tudomanyos Akademia, Akademia ut 2, Budapest V, Hungary.

FATTY ACIDS:
"Effects of Certain Pure Long-Chain Polyunsaturated Fatty Acid Esters on the Blood Lipides of Man. Use of Polyunsaturated Fatty Acids in Atherosclerosis," by H. E. Worne and L. W. Smith, article, The American Journal of the Medical Sciences, vol. 237, 1959, pp. 710-721, printed. The American Journal of the Medical Sciences, Lea and Febiger, Philadelphia 6, Pa.

FISH CAKE:
Food Hygienical Studies on Japanese Fish-Cake Products. I--The Rate of Penetration of Cooking Tem-

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perature in Fish-Cakes of Commerce, by Keishi Amano and others, 15 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, no. 9, January 1955, pp. 816-829.) Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

A Study on the Preservation of Fish Cake: Part III--Effect of Plastic Casing Upon the Storage of Sugar-Added Fish Cake, by Hitoshi Uchiyama, Keishi Amano, and Motonobu Yokoseki, vol. 21, no. 6, October 1955, pp. 441-447; Part IV--Factors Involved in Preservative Effect of Carbon Dioxide, by Motonobu Yokoseki, Hitoshi Uchiyama, and Keishi Amano, vol. 22, no. 1, May 1956, pp. 35-40; (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries.) Both are printed in Japanese with English abstracts. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

FISH CULTURE:

The Function and Significance of Fish Culture in Relation to the Regional/Village Economy, by R. Soekarno, Occasional Paper No. 59/7, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand, 1959.

FISH DETECTION:

"Fischsuche und Fischortung" (Location and Detection of Fish), by J. Scharfe, article Protokolle zur Fischereitechnik, vol. 5, nos. 22/23, 1958, pp. 175-204, printed in German. Protokolle zur Fischereitechnik, Institut fur Netz-und-Materialforschung, Die Bundesanstalt fur Fischerei, 72 Neuer Wall, Hamburg 36, W. Germany.

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"Studies on the Nutritional Value of Defatted Fish Flour," by A. B. Morrison and J. A. Campbell, article, Federation Proceedings, vol. 19, Part I, March 1960, p. 326, printed. Federation of American Societies for Experimental Biology, 9650 Wisconsin Ave., NW., Washington 14, D. C.

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"Biological Evaluation of Factors Affecting the Protein Quality of Fish Meals," by N. T. Rand and others, article, Poultry Science, vol. 39, January 1960, pp. 45-53, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

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"On the Occurrence of Eicosatetraenoic, Docosapentaenoic and Docosahexaenoic Acids in Fish Oils," by Y. Toyama, Y. Iwata, and K. Fujimura, article, Fette-Seifen-Anstrichmittel, vol. 61, October 1959, p. 846, printed in German. Fette-Seifen-Anstrichmittel, Industrieverlag von Hernhaussen KG, Hamburg 11, Germany.

"Preparation of a Coating Material by Chlorination of Fish Oil. IV--Change of Molecular Weight of Fish Oil Caused by Chlorination," by Kosaku Suzuki, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 12, 1959, pp. 1008-1011, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

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The Softening Deterioration of Fish Sausage:

Part I--Some Chemical and Microscopical Aspects, by Hitoshi Uchiyama and Takeo Tanada, vol. 24, no. 2, June 1958, pp. 148-155, illus.;

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Part III--An Anaerobic Starch Digestion by BACILLUS CIRCULANS Isolated from Softened Part of Fish Sausage and Other BACILLUS Species, by Hitoshi Uchiyama, Motonobu Yokoseki, and Kootaro Motohashi, vol. 24, no. 5, September 1958, pp. 370-377, illus.;

Part IV--A New Preventive Means of the Softening Spoilage of Fish Sausage, by Hitoshi Uchiyama and Keishi Amano (Reprinted from Bulletin of Tokai Regional Fisheries Research Laboratory, no 26, November 1959, pp. 61-67, illus.);

Part V--Effect of Sodium Pyrophosphate and Sorbic Acid on the Growth of Spore of BACILLUS CIRCULANS, by Hitoshi Uchiyama and Keishi Amano, vol. 25, nos. 7-9, November 1959, pp. 531-544, illus.;

(Parts I, II, III, and V reprinted from Bulletin of the Japanese Society of Scientific Fisheries.) All are printed in Japanese with English abstracts. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

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"Ensilering af Fisk og Fiskeaffald" (Ensilage of Fish and Fish Offal), by P. Hansen, article, Meddelelse Fiskeriministeriets Forsogslaboratorium, May 1959, 26 pp., illus., printed. Fiskeriministeriets Forsogslaboratorium, Ostervoldgade 10, Copenhagen-K, Denmark.

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Edible Protein Products from Fish Solubles, by Jermiah Milner, U. S. Patent No. 2,857,278, October 21, 1958. U. S. Patent Office, Washington 25, D. C.

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Catalogue of FAO Fisheries Publications, August 1960, compiled by Patricia M. Andrews, 20 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. Lists periodicals, FAO Fisheries Studies, FAO Fisheries Papers, separate publications, and publications of the General Fisheries

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Council for the Mediterranean. Also lists publications of the Indo-Pacific Fisheries Council, reports of the Latin American Fisheries Training Centers, reports of the Expanded Technical Assistance Program, and reprints of articles appearing in FAO Fisheries Bulletin and other periodicals.

Soil and Water Conservation, vol. IV, Natural Aquatic Resources, 376 pp., printed in French and English. International Union for Conservation of Nature and and Natural Resources, 31 rue Vautier, Brussels 4, Belgium, 1960. Contains papers presented at the Seventh Technical Meeting of I. U. C. N., Athens, September 1958, including those on basic elements--definition of soil and water conservation, definition of aquatic resources, and the uses of water and soils and the changes which man wishes to bring about in them. Papers also discuss the effect of land and water use on the aquatic environment--various soil conservation measures, engineering constructions; dredging operation, and pollution control; and the methods whereby deleterious effects of land and water use practices on aquatic resources can be minimized and, wherever possible, made to increase the resources.

The Use of Fishery Statistics by Government and Business in Northwest Europe, by G. M. Gerhardsen, FAO Fisheries Papers No. 17, 14 pp., processed, limited distribution. Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, June 1960. Working paper presented at the Expert Meeting on Fishery Statistics in the North Atlantic Area, Edinburgh, Scotland, September 1959. Discusses the need for fishery statistics by Government and business; and available statistics on catch and landings, manpower, fishing craft and gear, processing establishments, and fish marketing. Also discusses international aspects of statistical systems; assessment of adequacy of statistics; and desirable trends in the development of fishery statistics.

The Food and Agriculture Organization has published reports describing that Agency's activities under the Expanded Technical Assistance Program for developing the fisheries of many countries. These reports have not been published on a sales basis, but have been processed only for limited distribution to governments, libraries, and universities. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

Fishery Resources of the Inland Waters (U. A. R. --Northern Region), by W. C. Beckman, FAO Report No. 1045, processed, 1959.

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Marine Fishery Biology (Indonesia), by T. H. Butler, FAO Report No. 1057, processed, 1959.

Methodology and Techniques of Research on Mackerel (Thailand), by S. J. Holt, FAO Report No. 1095, processed, 1959.

Marine Fishery Resources (Philippines), by K. F. W. Tiews, FAO Report No. 1141, processed, 1959.

International Training Center on Handling and Processing of Fish (Thailand), by G. Sand, FAO Report No. 1164, processed, 1959.

The Kalaat el Mondik Experimental Fish Culture Station (U. A. R. --Northern Region), by W. F. J. Wunder, FAO Report No. 1199, processed, 1960.

The Development of Fishing Harbours in the States of Bombay, Kerala and Madras, by Carl G. Bjuke and C. Ragnar Bjuke, FAO Report No. 1242, processed, 1960.

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Food Consumption and Dietary Levels of Households Related to Employment of Homemaker, United States--by Region, Household Food Consumption Survey 1955, Report No. 15, 130 pp., illus., processed, 75 cents. U. S. Department of Agriculture, Washington, D. C., May 1960. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) This report contains a portion of the data from the U. S. Department of Agriculture's nationwide Survey of Household Food Consumption made in the spring of 1955. The survey was part of the Department's broad program of research on family dietary levels and the marketing and utilization of farm products. The survey was based on a national probability sample of approximately 6,000 housekeeping households of one or more persons. Data on "fish and shellfish" as a separate category are included in the tables.

FOOD POISONING:

"Studies on the Food Poisoning Associated with Putrefaction of Marine Products," by Toshiharu Kawabata and Shigeru Suzuki, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, October 1959, pp. 473-480, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shibakaigandori 6-chome, Tokyo, Japan.

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"Accelerated Freeze-Drying of Food," by S. W. F. Hanson, article, Food, vol. 28, no. 334, 1959, pp. 245-248, printed. Food, Tothill Press, Ltd., 33 Tothill St., London S. W. 1, England.

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"Atlantic Seal Hunt, 1960," by J. J. Quigley, article, Trade News, vol. 13, no. 1, July 1960, pp. 8-9, illus., processed. Information and Educational Service, Department of Fisheries, Ottawa, Canada. Describes the 1960 harvest of fur seals by Newfoundland, Nova Scotia, and Norwegian fleets in the Gulf of St. Lawrence and along Newfoundland's northern front. The Nova Scotia fleet took an estimated 80,000 pelts, valued at $320,000. Despite innovations such as aerial spotting surveys, walkie-talkies, and power winches for loading pelts, however, the seal hunt is still a dangerous and strenuous operation and is today only a shadow of its former self.

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"Effect of the Ingestion of Trianophorus Plerocercoids on the Nutritional Characteristics of Whitefish Fillets in the Rations of Puppies," by E. W. Crampton, article, Journal of the Fisheries Research Board of Canada, vol. 17, January 1960, pp. 81-90, printed. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

INTERNATIONAL BANK:

"Inter-American Development Bank--a New Venture in Regional Banking," by Larry F. Thomasson, article, Foreign Agriculture, vol. 24, no. 8, August 1960, pp. 8-9, printed. Foreign Agricultural Service, U. S. Department of Agriculture, Washington, D.C. (Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Discusses the background and functions of the Inter-American Development Bank, founded on January 1, 1960, with a membership including the United States and all Latin American Republics except Cuba. The broad objective of the Bank is to accelerate the general economic development of Latin America, with all Latin American countries sharing in the cost and in the responsibility for success.

IRRADIATION:

"Chemical Properties of Oils in Gamma-Radiation Fish Meat and Products. I," by Takashi Kaneda, Hisae Sakai; and Seinosuke Ishii, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 11, 1959, pp. 909-919, printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shibakaigandori, 6-chome, Tokyo, Japan.

Effects of Gamma Irradiation on the Quality and Storage of Fish, by Keishi Amano and Kinjiro Yamada, 12 pp., illus., printed in English with Japanese abstract. (Reprinted from Bulletin of Tokai Regional Fisheries Research Laboratory, no. 26, November 1959, pp. 51-59.) Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

"Irradiation Preservation of Pacific Northwest Fish. I--Cod Fillets," by David T. Miyauchi, article, Food Technology, vol. 14, no. 8, August 1960, pp. 379-382, printed. The Garrard Press, 510 North Hickory, Champaign, Ill. The specific objective of this study was to determine the effect of varying doses of ionizing radiation on the palatability and storage characteristics of raw fillets of Pacific cod held at refrigeration temperatures above freezing. Pacific cod fillets were irradiated at various dosage levels from 0 to 1.86 megarads to determine their initial acceptability and storage characteristics at refrigerated temperatures (32° to 35° F.). The optimum irradiation dose for cod fillets appeared to be 0.46 megarads or lower. Irradiation at these low dosage levels increased the storage life of cod fillets at 32° to 35° F. by about three times. The objective freshness tests investigated, including determinations for total volatile base, total volatile acid, trimethylamine, and plate counts, did not appear to be a reliable index of quality.

"_____: Precooked Fish Sticks," by David T. Miyauchi, ibid., p. 411. In this study, the storage characteristics at room temperature of fish sticks irradiated at 1.0 and 2.0 megarads were poor. The storage life at 35° F. of irradiated fish sticks packed in cans was about 8 to 12 weeks, but the irradiated fish sticks were only fair in organoleptic quality throughout most of their storage life because a musty odor developed and the white meat darkened.

ISRAEL:

Fishermen's Bulletin, vol. 3, no. 4 (24), June 1960, 36 pp., illus., printed in Hebrew with English abstracts. Fishermen's Bulletin, P.O.B. 699, Haifa, Israel. Contains, among others, these articles: "The Red Sea--Its Importance to Research and Fisheries," by H. Steinitz; "New Trawling Grounds in Deep Water," by M. Ben-Yami and A. Ben-Tuvia; and "Impressions on the Red Sea Trawl Fishery."

ITALY:

"En Italie Intervention de l'Etat dans le Developpment de la Peche Atlantique" (In Italy, Intervention of the State in the Development of the Atlantic Fishery), by Cesare de Felipe, article, France Peche, vol. 5, no. 42, July-August 1960, pp. 25-26, printed in French. France Peche, Tour Sud-Est, rue de Guemene, Lorient, France.

JAPAN:

Annual Report of Catch Statistics on Fishery and Aquiculture, 1958, Agriculture Forestry and Fishery Statistics Bulletin 34-40, 412 pp., printed in Japanese and English. Statistics and Survey Division, Ministry of Agriculture and Forestry, Tokyo, Japan, October 1959. Contains statistical information on the 1958 production of marine fisheries--whaling, pelagic fisheries on high seas, and domestic marine fisheries--whaling, pelagic fisheries on high seas, and domestic marine fisheries; culture in shallow seas, inland water fisheries; and culture in inland waters. Also presents data on processing, average market prices of fishery commodities, estimated value of catch, and consumption of petroleum products for fisheries.

An Attempt for Estimating Time of Dragnet Fishing from Freshness of the Catch, by Taneko Suzuki, 10 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of Tokai Regional Fisheries Research Laboratory, No. 26, November 1959, pp. 99-108.) Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

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Enhancing Effect of Starch on Jelly Strength of Fish Meat Jelly. II--Effect of Amylose and Amylopectin, by Minoru Okada and Atsuko Yamazaki, 8 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 23, nos. 7 & 8, November 1957, pp. 476-482.) Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

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Influence of Urea Upon the Binding of Some Ionic Dyes to Proteins, by Masao Migita and Shigeo Otake, 8 pp. illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 8, December 1958, pp. 663-670.) Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

Utilization of Discarded Trawl Catches as Feed for Livestock, by H. Higashi and others, 26 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of Tokai Regional Fisheries Research Laboratory, no. 18, October 1957, pp. 47-72.) Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

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Fish Production and Consumption in West Java, by Rabdul Pahari, Occasional Paper No. 59/6, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand, 1959.

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"Second International Conference on the Law of the Sea," by J.P.A. Francois, article, United Nations Review, vol. 6, no. 12, June 1960, pp. 12-14, printed. International Documents Service, Columbia University Press, 2960 Broadway, New York 27, N. Y.

MARINE ALGAE:

Economic Marine Algae of Tropical South and East Asia and Their Utilization, by J. S. Zaneveld, Special Publication No. 3, 55 pp., printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand, 1955.

Journal of the Marine Biological Association of the United Kingdom, vol. 39, no. 2, June 1960, pp. 153-416, illus., printed, $10.50. Journal of the Marine Biological Association, Cambridge University Press, 32 E. 57th St., New York 22, N. Y. Contains, among others, the following articles: "Studies on Marine Algae of the British Isles: the Genus Ceramium," by Peter S. Dixon; and "Studies on Marine Algae of the British Isles: Ceramium shuttleworthianum (Kutz.) Silva," by Peter S. Dixon.

MARINE BIOLOGY:

Marine Biology: Twentieth Annual Biology Colloquium, 1959, by Ivan Pratt and James E. McCauley, 96 pp., illus., printed, $2.50. Oregon State College, Corvallis, Oreg., 1960.

MARINE CLIMATIC ATLAS:

U. S. Navy Marine Climatic Atlas of the World, vol. 1, North Atlantic Ocean, no. 17N, 275 pp., 1955, $8; vol. 2, North Pacific Ocean, no. 18N, 275 pp., 1957, $8; vol. 4, South Atlantic Ocean, no. 20N, 267 pp., 1958, $8.50; and vol. 5, South Pacific Ocean, no. 21N, 267 pp., 1960, $8. U. S. Navy, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Four volumes of a marine climatic atlas, presenting meteorological information for the surface and upper air over the oceans.

MENHADEN:

"Menhaden--Our Largest Commercial Catch," article Monthly Review, Federal Reserve Bank of Richmond, August 1960, pp. 2-5, illus., printed. Federal Reserve Bank of Richmond, Richmond, Va. Covers briefly the economic significance of the menhaden industry, the uses of menhaden products, method of landing, processing the catch, and problems and progress of the industry in recent years. Discusses the use of scouting planes for locating the schools, the use of the power block on the vessels, and the use of refrigeration.

MICRONESIA:

Fishes of the Marshall and Mariana Islands, vol. 2: Families from MULLIDAE through STROMATEIDAE, by Leonard P. Schultz and others, U. S. National

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Museum Bulletin 202, 438 pp., illus., printed, $2.25. Smithsonian Institution, Washington, D. C. (Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

MILKFISH:
Synopsis of Biological Data on Milkfish CHANOS CHANOS (Forskal), by W. H. Schuster, Occasional Paper No. 59/3, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand, 1959.

NEW ZEALAND:
Report of the Marine Department for the Year Ended 31 March 1960, 85 pp., printed. Marine Department, Wellington, New Zealand, 1960. Covers the activities and accomplishments of the Marine Department, including a report on fisheries for 1959. The latter discusses the quantity and value of spiny lobster and fish landings, fishing vessels, total landings at various ports, foreign trade in fishery products, and fish-liver oil production. It also discusses the whaling season, rock- and dredged-oyster landings, freshwater and marine fisheries research. Fishing Industry Advisory Council, and fishery legislation. All data are for the calendar year 1959.

NORTH AMERICA:
Fishes from the United States and Canada (second edition), by Reeve M. Bailey, 102 pp., printed, paper $1. Librarian, American Fisheries Society, Colorado A. & M. College, Fort Collins, Colo. Revised and enlarged list of accepted common names, occurrence, and scientific names, fully indexed.

NORTH ATLANTIC:
"Perspektivy Razvitia Rybolovstva v Seviernoi Atlantikie" (Fishing Prospects in the North Atlantic), by I. I. Marti, article, Rybnoe Khoziaistov, vol. 35, no. 4, 1959, pp. 3-8, illus., printed in Russian. Rybnoe Khoziaistvo, VNIRO Glavniproekta, pri Gosplanie SSR, Moscow, U.S.S.R.

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Vekslinger i Forekomsten av Forskjellige Fiskeslag pa Skagerakkysten (Fluctuations in the Abundance of Some Fishes on the Norwegian Skagerack Coast), by Alf Dannevig, Fiskeridirektoratets Skrifter, Serie Fiskeri, vol. 4, no. 3, 29 pp., illus., printed in Norwegian with English summary. A/S John Griegs Boktrykkeri, Bergen, Norway, 1959.

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"Incidence and Distribution of Infestation by Sphyrion lumpi (Kroyer) on the Redfish, Sebastes marinus (L.), of the Western North Atlantic, by Wilfred Templeman and H. J. Squires, article, Journal of the Fisheries Research Board of Canada, vol. 17, January 1960, pp. 9-31, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

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Under the Deep Oceans: Twentieth Century Voyages of Discovery, by T. F. Gaskell, 240 pp., illus., printed, $3.95. W. W. Norton & Co. 101 Fifth Ave., New York 3, N. Y.

PACKAGING:
"Quelques Aspects du Probleme de l'Emballage des Denrees Alimentaires Sterilisees par les Radiations Ionisantes" (Some Aspects of the Problem of Packaging Foodstuffs Sterilized by Ionizing Radiations), by L. Brunelet and P. Vidal, article, Revue Generale du Froid, vol. 35, no. 7, 1958, pp. 681-685, printed in French. Association Nationale des Ingenieurs et Techniciens du Froid et des Industries Connexes, 129 Boulevard St. Germain, Paris, France.

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"Polish Sea Fishing," by Andrezej Ropelewski, article, Studies and Monographs, Western and Northern Territories of Poland--Maritime Problems, April 1960, pp. 33-44, illus., printed. Department of Studies and Monographs, Nowy Swiat 27, Warsaw, Poland. Discusses the history of Polish marine fisheries and their expansion after World War I, losses to the fisheries during World War II, restoration and reconstruction, increases in annual catch since 1946, Government aid to the fisheries, and the present fisheries, and the present fishing fleet. Also covers the ownership of the fishing fleet, employment in the fisheries, training of fishing crews, fresh-water fisheries, consumption, and prospects of future development of Polish fisheries. Included are a number of tables and graphs showing fish catches, vessels, and consumption of fishery products.

PORTUGAL:
Boletim da Pesca, vol. 13, no. 67, June 1960, 134 pp., illus., printed in Portuguese. Gabinete de Estudos das Pescas, R. S. Bento, 644, 4°-Esq., Lisbon, Portugal. Contains, among others, the following articles: "Consideracoes Sobre a Industria do Peixe Fresco na Metropole e em Angola" (Observations on the Fresh Fish Industry of Portugal and Angola), by C. Fernando Costa; and "Biologia Marinha no Grande Nordeste Brasileiro" (Marine Biology in the Area off Northeast Brazil), by Rui Simoes de Meneses.

"A Economia das Pescas em Portugal, a Industria de Conservas de Peixe" (Portuguese Fisheries Economics with Reference to Canned Fish), by Salviano Cruz, article, A Revista de Pesquisas Economico-Sociais, vol. 4, nos. 1-6, January-June 1955, 316 pp., plus 32 maps and charts, illus., printed in Portuguese. Estudos-Economico-Sociais, Avenida Sidonio Pais, 4-5°, 3-E, Lisbon, Portugal, 1958.

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Torry Research Station Annual Report 1959, Handling and Preservation of Fish, 36 pp., printed, 2s. 6d. (about 35 U. S. cents). Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland, 1960. Describes accomplishments in research during 1959 on improvement in quality of iced fish, freezing and cold storage, smoke curing, drying, canning, and fishery byproducts. Includes work on assessment of freshness of fish, preservative ices, jacketed cold stores, smoke deposition, "browning" of dehydrated and salted fish, reduction of free liquor in herring packs, fishmeal pilot plants, bacteriology of ice, fish muscle proteins, and many others.

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Study of Possible Relationship between Radioactivity and Toxicity in Fishes from Central Pacific, by Philip Helfrich, 18 pp., processed, 50 cents. Marine Biology Laboratory, University of Hawaii, Honolulu, Hawaii, May 1960.

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"Sodium Ion, Potassium Ion, and Weight Changes in Fish Held in Refrigerated Sea Water and Other Solutions," by Robert A. MacLeod, R.E.E. Jonas, and J. R. McBride, article, Journal of Agricultural and Food Chemistry, vol. 8, March-April 1960, pp. 132-136, printed. Journal of Agricultural and Food Chemistry, American Chemical Society, 1801 K St., NW., Washington 6, D. C.

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"Recommended Conditions for Cold Storage of Perishable Foodstuffs. III--Fish and Crustaceans: Chilled Storage," article, Bulletin of the International Institute of Refrigeration, Annex, 1959, pp. 46-49, printed in French and English. International Institute of Refrigeration, 177 Boulevard Malesherbes, Paris, France.

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"Biochemical Studies on Sockeye Salmon During Spawning Migration. IX--Fat, Protein, and Water in the Major Internal Organs and Cholesterol in the Liver and Gonads of the Standard Fish," by D. R. Idler and I. Bitners, article, Journal of the Fisheries Research Board of Canada, vol. 17, January 1960, pp. 113-122, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

"Investigation and Management of Atlantic Salmon in 1959-60," articles, Trade News, vol. 12, no. 12, June 1960, pp. 3-16, illus., processed. Information and Educational Service, Department of Fisheries, Ottawa, Canada. "Part 1--The Research Programme," by C. J. Kerswill, covers availability of adult salmon, migrations and homing, production of young salmon, environmental changes, and behavior studies. Also included are several tables and charts depicting the commercial and sports fishery catches of salmon in eastern Canada in recent years. "Part 2--The Management Programme," discusses the salmon management effort in the Newfoundland, Quebec, and Maritime areas of eastern Canada. This includes projects such as studies on proposed hydro-electric development, stream improvement, stationery net licensing, construction of fishways, pollution control, and hatchery-spawning and rearing of young salmon.

The Salmon, by J. W. Jones, 206 pp., illus., printed. N. M. N. Collins, St. James Place, London, England, 1959.

SALT FISH:

"The Factors Impeding and Accelerating the Process of Rusting of Salted Fish," by E. A. Mel'nikova, article, Voprosy Pitaniya, vol. 17, no. 5, 1958, pp. 59-63, printed in Russian. Voprosy Pitaniya, Gosudarstvennoe Izdatel'stvo Meditsinskoi Literatury, Moscow, U.S.S.R.

"The Preservation of Salted Fish and Packaging with Polyethylene," by R. Lafont, article, Indo-Pacific Fisheries Council Proceedings, 6th Session, 1955, p. 287, printed in French. Indo-Pacific Fisheries Council Secretariat, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand, 1956.

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"Our North Sea Dilemma--The Sand Eel Story--Part I," article, World Fishing, vol. 9, no. 7, July 1960, pp. 30-32, illus., printed. John Trundell (Publishers), Ltd., St. Richards House, Eversholt St., London NW1, England. A discussion, in the form of questions and answers, of the characteristics of the sand eel or sand launce, their location and distribution, life cycle and feeding habits, natural enemies, method of landing, nations engaged in the fishery, volume of annual catch, and catching season. A forthcoming article will discuss the future outlook of the sand eel fishery.

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"Plant Sanitation in Frozen Foods--A Management Attitude," by Albert W. Emery, article, Quick Frozen Foods, vol. 22, February 1960, pp. 40-41, 156, printed. Quick Frozen Foods, E. W. Williams Publications, Inc., 82 Wall St., New York 5, N. Y.

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La Peche Maritime, vol. 39, no. 988, July 1960, 64 pp., illus., printed in French. La Peche Maritime, 190 Boulevard Haussmann, Paris, France. Contains the following articles on the sardine industry: "Ou l'Evolution du Port de Douarnenez" (The Development of the Port of Douarnenez); "l'Evolution de l'Industrie Portugaise de la Sardine (The Development of the Portuguese Sardine Industry); "Safi, Premier Port Sardinier d'Afrique" (Safi, Principal African Sardine Fishery Port), by A. Meunier; and "l'Industrie de la Conserve Espagnole ne Craint pas Son Entree dans le Marche Commun" (The Spanish Canning Industry is not Apprehensive of Entering into the Common Market).

SEAWEEDS:

Chemical Studies on Seaweeds. I--Chemical Constituents of "Asakusanori" of Various Sources, by Takeshige Yamakawa, 5 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 18, no. 10, 1953, pp. 478-482.) Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"Dulse Harvest," by G. J. Gillespie, article, Trade News, vol. 13, no. 1, July 1960, pp. 6-7, illus., processed. Information and Educational Service, Department of Fisheries, Ottawa, Canada. Describes the harvest of dulse, a seaweed, from the shores of Dark Harbour, Grand Manan Island, at the mouth of the Bay of Fundy. Gathered from the rocks along the lagoon's shoreline, the dulse is spread to dry in the sun, rolled up like a carpet, and then packed in bags for shipping to distributors. This seaweed is high in

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protein and mineral content and brings as much as 43 cents a pound, helping to bolster the economy of the Island.

SHRIMP:
"Essayons d'Augmenter en France la Peche a la Crevette" (Let Us Try to Develop Shrimp Fishing in France), by Robert Lenier, article, France Peche, vol. 5, no. 42, July-August 1960, pp. 17-24, illus., printed in French with English summary. France Peche, Tour Sud-Est, rue de Guemene, Lorient, France.

SINGAPORE:
Report of the Fisheries Division 1958, 29 pp., printed. Fisheries Division, Ministry of Commerce and Industry, Singapore. Reviews the achievements of the Fisheries Division during 1958 and discusses development of brackish-water shrimp ponds, the fisheries loan fund, the fisheries mobile unit, the apprenticeship training scheme, and the prospects for a trawl fishing industry. Also covers an inventory of the industry--manpower, licensed fishing boats, and gear, and pond cultivation of fish; fresh fish supplies--gross landings, local production, and imports and exports of fresh fish; fresh fish prices; trade in dried salt fish and other marine products; and cost of fishing material. A large portion of the report is devoted to statistical tables showing number of fishermen, licensed vessels and gear, fresh fish supplies, foreign trade in fishery products, and other pertinent data.

SMALL BUSINESS:
Providing Capital for Your Firm, by Nathaniel C. Berkowitz, Management Aids for Small Manufacturers No. 115, 4 pp., printed. Small Business Administration, Washington 25, D. C., June 1960. Suggestions on providing capital for a small business are outlined in this leaflet. A firm's need for cash may suddenly be critical. Without it, a company may lose an opportunity or head for serious trouble. So it is vital that management be aware of sources of funds. Some of the things to be considered in looking for capital are: streamlining internal operations, tightening up trade relationships, selling excess assets, factoring (selling accounts receivable), borrowing from financing organizations, and taking a partner or selling stock. A list of references is included.

SOFT-SHELL CLAM:
A Partial Bibliography of the Soft Shell Clam, MYA ARENARIA L., by Hayes T. Pfitzenmeyer and Carl N. Shuster, Jr., Contribution No. 123, 29 pp., illus., printed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md. January 1960. In recent years a serious decline in the production of the soft-shell clam in New England and the establishment of a fishery in the State of Maryland have created a need for more concentrated scientific study of this species. As an aid to biological research, these literature citations were compiled as a preliminary step to a more complete annotated bibliography.

SPAIN:
"La Pesca de la Gamba y de la Langosta" (The Shrimp and Spiny Lobster Fisheries), by Miguel Massuti Oliver, article, Puntal, vol. 7, no. 75, June 1960, pp. 7-11, illus., printed in Spanish. Puntal, Apartado de Correos 316, Alicante, Spain.

SPERM WHALES:
"On the Stocks of Sperm Whales (Physeter catodon) in the Antarctic," by Age Jonsgard, article, Norsk Hvalfangst-Tidende (The Norwegian Whaling Gazette), vol 49, no. 7, July 1960, pp. 289-299, illus., printed in Norwegian and English. Norsk Hvalfangst-Tidende, Sandefjord, Norway. Discusses the changes in the size distribution of sperm whale stocks in the Antarctic in recent years and the changes in the catch per unit of effort. Also discusses possible causes for the changes in the size composition of sperm whales--seasonal changes, geographical changes, selective catching, increased whaling effort, and special conditions relating to migration.

SPINY LOBSTER:
"Que Va Devenir le Marche de la Langouste?" (What is Going to Happen to the Spiny-Lobster Market?), article, France Peche, vol. 5, no. 42, July-August 1960, p. 35, printed in French. France Peche, Tour Sud-Est, rue de Guemene, Lorient, France.

SQUID:
"Studies on Processing Squid Meat," by T. Takahashi and M. Takei, article, Bulletin of Tokai Regional Fisheries Research Laboratory, no. 14, September 1956, pp. 31-90, illus., printed in Japanese with English abstract. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan.

On the Toughness of Boiled Squid Meat, by Toyo-o Takahashi and Makoto Takei, 5 pp., illus., printed in Japanese with English summary. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 20, no. 11, March 1955, pp. 1015-1019.) Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

STEELHEAD TROUT:
Scale Analysis of Steelhead Trout, SALMO GAIRDNERII GAIRDNERII Richardson, from Various Coastal Watersheds of Oregon (Thesis of John Morton Ball for the Master of Science Degree in Fisheries), 203 pp., illus., processed, not for general distribution. Department of Fish and Game Management, Oregon State College, Corvallis, Oreg., July 1958.

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STICKWATER:
"Stickwater Vitamins," by J. S. Dunn, article, South African Shipping News and Fishing Industry Review, vol. 14, no. 6, 1959, pp. 64-65, printed. South African Shipping News and Fishing Industry Review, Odhams Press, S. Africa (Pty) Ltd., P. O. Box 2598, Cape Town, Union of South Africa.

SURINAM:
The Fishermen of Surinam, by Kalervo Oberg and Frank van Kijk, 66 pp., illus., processed. Surinam-American Technical Cooperative Service, Paramaribo, Surinam, April 1960. Contains a general summary,

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of Surinam fisheries and then discusses in detail the industry in each of 6 areas--Paramaribo, Nickerie, Coppername Point, Matapica, Albina, and Coronie. The first part outlines the two major types of fishing--the older traditional system of inshore fisheries, in which the majority of the fishermen are engaged, and the very recent system of offshore fisheries in which modern trawlers are engaged. Emphasis is placed on kinds of gear used, the methods of fishing, the living conditions of the people, and the values and interests which motivate the fishermen. This report is intended to contribute towards the planning of a realistic extension program for fishermen. The aim of the fisheries development program is to double the annual catch of 4,000 tons by 1965. The report concludes with a number of tables showing the fishing grounds used in the traditional system of inshore fisheries, distribution of fishing operators by area and type of fishing, distribution of fishing operators by ethnic origin, and other pertinent data.

TAGGED FISH:

"Recaptures of Tuna, Marlin, and Sailfish Tagged in the Western North Atlantic," by Frank J. Mather, III, article, Copeia, no. 2, June 29, 1960, pp. 149-151, printed. American Society of Ichthyologists and Herpetologists, 34th St. and Girard Ave., Philadelphia 4, Pa.

TRADE AGREEMENTS:

Fourth Annual Report on the Trade Agreements Program, 86th Congress, 2d Session, House Document No. 447, 119 pp., processed. The White House, Washington, D. C., July 1960. (Available from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.) The following subjects are discussed: (1) international trade in 1959; (2) removal of restrictions against U. S. exports; (3) trade agreements program and the GATT; (4) regional integration; (5) safeguarding procedures of the trade agreements program; and (6) United States tariff negotiations. Also includes a report on relaxation of quantitative restrictions against United States exports and reports to the Secretary of State by the Chairman of the United States Delegation to the Fourteenth and Fifteenth Sessions of the Contracting Parties to the General Agreement on Tariffs and Trade.

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"Studies on the Kinematic Behavior of the Ground Rope of the Trawl Net. I," by Tasae Kawakami and Otohiko Suzuki, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, October 1959, pp. 413-416, printed. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

"A Study on the Fishing Efficiency of the Otter Trawl and the Two-Boat Trawl in Operation by the Shape of Their Net," by Chikamasa Hamuro, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 25, June 1959, pp. 103-110, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

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"Holdbarhedsproblemer ved Ispakning af Damorreder" (Icing of Trout), by P. Hansen, article, Ferskvandsfiskeribladet, vol. 57, no. 3, 1959, pp. 34-38, illus., printed in Danish. Ferskvandsfiskeribladet, Frederiksdal, Kgs., Lyngby, Denmark.

Some Physical and Mechanical Factors Important in Reducing Delayed Mortality of Hatchery Reared Rainbow Trout (Thesis of Howard Franklin Horton for the Master of Science Degree in Fisheries), 60 pp., illus., processed, not for general distribution. Department of Fish and Game Management, Oregon State College, Corvallis, Oreg., May 1955.

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"Larval Tunas from the Florida Current," by W. L. Klawe, article, Bulletin of Marine Science of the Gulf and Caribbean, vol. 10, no. 2, June 1960, pp. 227-233, illus., printed. The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Virginia Key, Miami 49, Fla.

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Some Experiments on Tuna Fishing with a New Method in the Indonesian Waters, by Mohammad Unar, Occasional Paper No. 59/8, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand, 1959.

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The South African Pilchard (SARDINOPS OCELLATA) and Maasbanker (TRACHURUS TRACHURUS), Hydrographical Environment and the Commercial Catches, 1950-57, by M.E.L. Buys, Division of Fisheries Investigational Report No. 37, 176 pp., illus., printed. (Reprinted from Commerce & Industry, July 1959.) The Government Printer, Pretoria, Union of South Africa, 1959.

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Herring Industry Board, Twenty-Fifth Annual Report, 1959, 54 pp., illus., printed, 3s. (about 42 U. S. cents). Her Majesty's Stationery Office, York House, Kingsway, London WC2, England, March 1960. Reports on the state of the herring fisheries of the North Sea; commercial and statutory arrangements between or concerning the Herring Industry Board, the catches, and the shore-based sections of the industry; marketing; production, research, and development; and related subjects. Contains statistical tables showing

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the landings and value of catches and disposal of landings during the winter, summer, and autumn seasons; composition and distribution of fleets in East Anglia; curing strength and production of cured herring; imports of fresh and frozen herring; disposal of the United Kingdom's total herring landings, excluding imports; and applications for grants and loans. The appendix consists of a summary of pertinent directions having seasonal effect which were issued during 1959. The report mentions the new International Fisheries Convention, signed by the United Kingdom early in 1959. This Convention will allow the introduction of such measures of conservation as may be agreed to be necessary to ensure that the internationally-exploited European herring fisheries are managed to the best advantage of all concerned.

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"Problems and Trends in the Fish Industry. I," by C. L. Cutting, article, Food Manufacture, vol. 34, no. 7, 1959, pp. 281-283, printed. Food Manufacture, Leonard Hill Ltd., Eden St., London NW1, England.

Seals and Scottish Fisheries, by Bennet B. Rae, Marine Research No. 2, 1960, 39 pp., illus., printed, 15s. 0d. (about US$2.10). Department of Agriculture and Fisheries for Scotland, Aberdeen, Scotland, 1960. (Available from Her Majesty's Stationery Office, 13A Castle St., Edinburgh 2, Scotland.) A brief historical account is given from the passing of the Grey Seals Protection Act in 1914 to the present time. The numbers, distribution, and food of the common and grey seals are studied. Claims by fishermen of destruction to salmon fisheries are examined as well as the effect of seals on marine fisheries. The harmful effect on fish, particularly cod, by the spread of a larval, parasitic worm and its correlation with the occurrence of large seal populations is discussed. The case for the conservation of seals is reviewed and recommendations made for a reduction in seal stocks.

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"Fishery Research in Russia," article, World Fishing, vol 9, no. 7, July 1960, pp. 22-23, illus., printed. John Trundell (Publishers) Ltd., St. Richards House, Eversholt St., London NW1, England.

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"The Measurement of Fishing Power and Its Relation to the Characteristics of Vessels," by B. B. Parrish and R. S. Keir, article, Current Affairs Bulletin, no. 27, April 1960, pp. 1-9, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand. Defines the fishing power of a fishing unit and describes how it is measured by comparative fishing trials and analysis of catch and effort statistics. The results obtained in correlating fishing power with measurable characteristics of the craft are briefly summarized and the uses to which this information is put for purposes of resource assessment and management are outlined. Needs for future studies are discussed.

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"Estimation of the Biological Potency of Vitamin A Sources from Their Maleic Values," by Stanley R. Ames and Robert W. Lehman, article, Journal of the Association of Official Agricultural Chemists, vol. 43, February 1960, pp. 21-25, printed. Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C.

Studies on the Economical Manufacture of Vitamin A Concentrate from Fish Liver Oil:

Part I--Molecular Distillation of Modified Oil, by Hideo Higashi, Yaichiro Shimma, and Toyosuke Kinumaki, vol. 20, no. 4, August 1954, pp. 328-336, illus.;

Part II--Concentration of Vitamin A by Saponification. 1--Reexamination of Takahashi's Method, by Yaichiro Shimma and Toyosuke Kinumaki, vol. 20, no. 4, August 1954, pp. 337-343, illus.;

Part III--Concentration of Vitamin A by Saponification. 2--Precipitating Method, by Yaichiro Shimma and Toyosuke Kinumaki, vol. 20, no. 6, October 1954, pp. 551-556, illus.;

Part IV--Application of Urea Complex in the Concentration of Vitamin A., by Hideo Higashi, Takeshige Yamakawa, and Toyosuke Kinumaki, vol. 20, no. 6, October 1954, pp. 557-562, illus.;

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Part VIII--Chromatographical Separation of Vitamin Concentrate, by Yaichiro Shimma and Minoru Tanaka, vol. 25, no. 1, May 1959, pp. 52-58, illus.;

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Water Milfoil Invasion of Tidewater Areas, by G. Francis Beaven, Reference No. 60-28, 4 pp., processed. Maryland Department of Research and Education, Chesapeake Biological Laboratory, Solomons, Md., July 20, 1960.

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Studies on the Molecular Distillation of Whale Liver Oils: Part I, vol. 18, no. 11, 1953, pp. 645-650, illus.; Part II, vol. 18, no. 12, 1953, pp. 675-682, illus., by Takeshige Yamakawa and Takajiro Mori; and Part III, by Takeshige Yamakawa, Shoji Konosu, and Takjiro Mori, vol. 19, no. 3, 1953, pp. 155-158, illus. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries.) All printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo University of Fisheries, Shiba-kaigandori 6-chome, Tokyo, Japan.

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"Some Observations on the Development of Whaling and on Its Central Problem Today," by Frithjof Bettum, article, Norsk Hvalfangst-Tidende, vol. 49, no. 6, June 1960, pp. 245-256, 258, 261-262, 264-265, printed in Norwegian and English. Norsk Hvalfangst-Tidende, Sandefjord, Norway. The full text of a lecture on whaling delivered at Norway's University of Economics and Business Administration. The author discusses the history of international whaling in the Antarctic area, the extent of the area and its resources, and conservation of the stocks. He also discusses the adoption of the International Whaling Convention in 1946, operations of the Antarctic whaling industry under the Convention, negotiations towards quota restrictions, results of the 1959/60 season, and the economic importance of the Norwegian whaling industry.

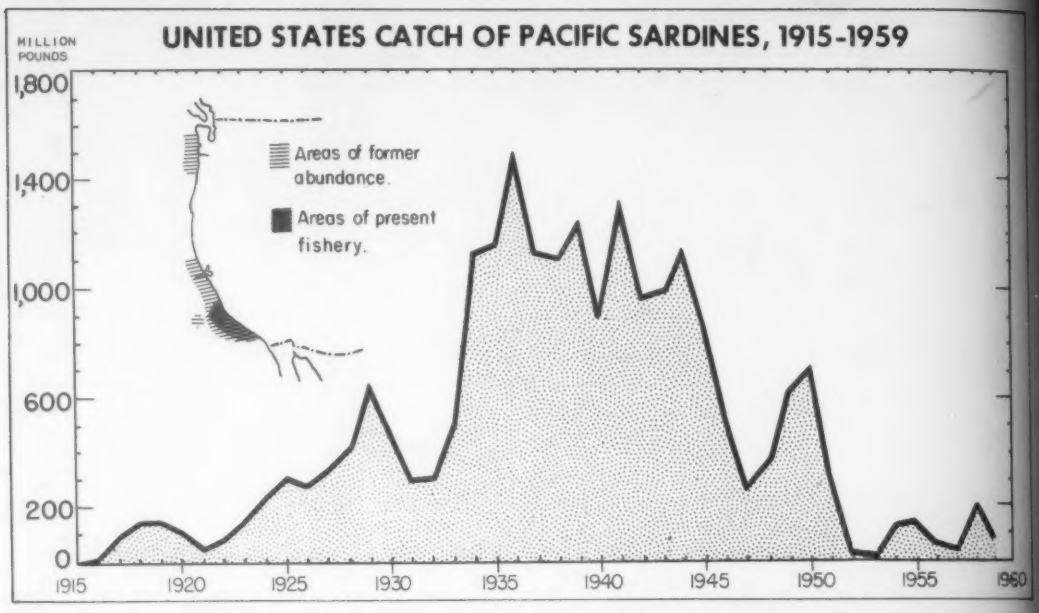
NEW SHRIMP PRODUCT ON MARKET

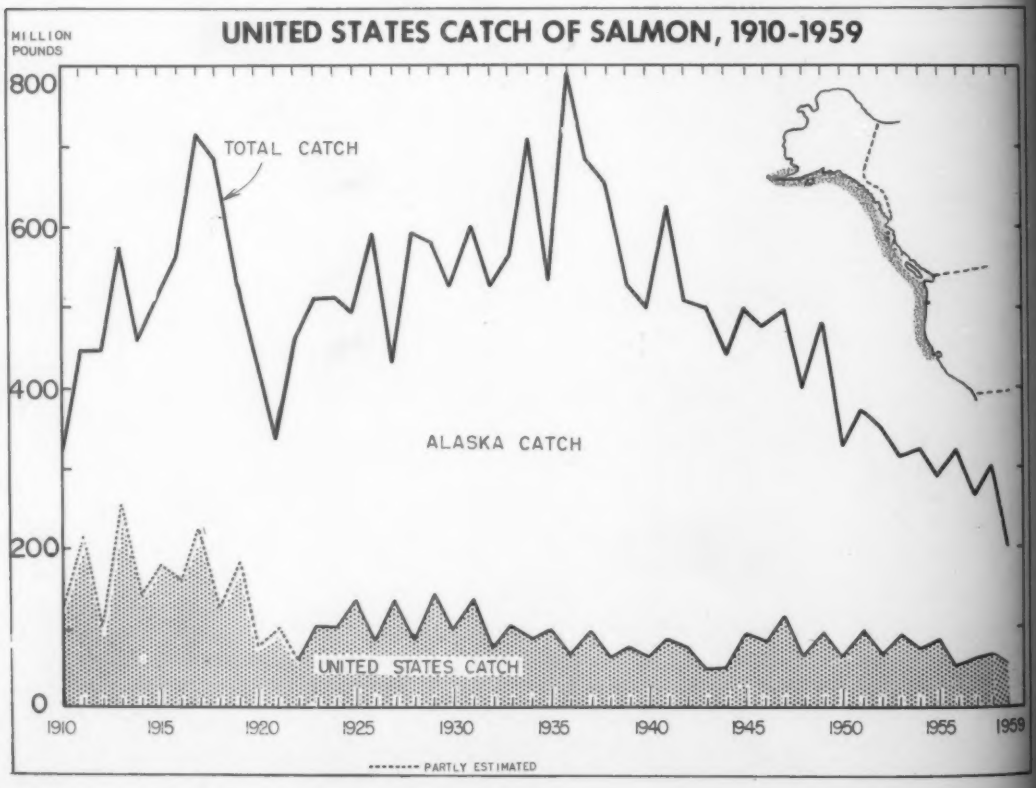
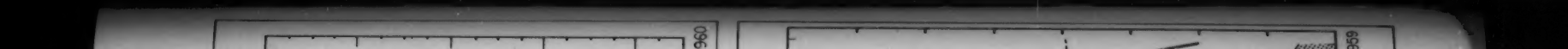
The shrimp industry now has available a moderate-priced product which can be used in a variety of dishes.

This product consists of pieces of shrimp meat which become available during the shrimp canning and breading process. A major part of the production of breaded shrimp in the United States is now packed under USDI continuous inspection. The tolerance for broken or pieces of shrimp which may be packed under the Grade A label is very low and this results in a supply of pieces which are sold at a price lower then that charged for unbroken shrimp tails.

Since this is only a physical defect, it has no effect on freshness or wholesomeness. This is a situation analagous to the shelling of various types of nuts where the broken segments are sold at a lower price. It now becomes possible to use shrimp in low cost dishes especially in school lunches and other types of cafeteria meals for which formerly shrimp was too costly.

Bureau of Commercial Fisheries home economists and marketing specialists are now using this product in school-lunch and other fish-cookery demonstrations since the product is available nationally both canned and frozen.


MILLION POUNDS
UNITED STATES CATCH OF PACIFIC SARDINES, 1915-1959
1,800
1,400
1,000
600
200
0
Areas of former abundance.
Areas of present fishery.
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960


MILLION POUNDS
UNITED STATES CATCH OF SALMON, 1910-1959
800
600
400
200
0
TOTAL CATCH
ALASKA CATCH
UNITED STATES CATCH
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1959
PARTLY ESTIMATED